

In This Issue—Is Yours "Just Another Garage"?

Engineering

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NOV 18 1921

# MOTOR AGE

Vol. XL  
Number 20

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, NOVEMBER 17, 1921

Thirty-five Cents a Copy  
Three Dollars a Year

## Lower Prices on the New Improved ESSEX

*They Give Essex Dealers  
a Winning Price Advantage*

|             |         |        |
|-------------|---------|--------|
| Touring Car | - - -   | \$1195 |
| Roadster    | - - - - | 1195   |
| Cabriolet   | - - - - | 1395   |
| Sedan       | - - - - | 1995   |

*Cord Tires Included*

*Prices f. o. b. Detroit*

### A Better ESSEX In Every Way For Less Money

The new Essex prices must appeal to all buyers

They give Essex another advantage. Official records and the testimony of thousands tell its performance and reliability.

Buyers today get more for their money than ever before. They not only get this price saving but they also get the New and Improved Essex.



This new car retains all the attraction of its forerunner. It is a smoother and finer car in many ways.

With the acknowledged position Essex has earned, both as to performance and steadfast reliability, do not these new low prices give it unequalled advantage in today's market?

Write regarding territory today.

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ESSEX MOTORS, DETROIT, MICHIGAN

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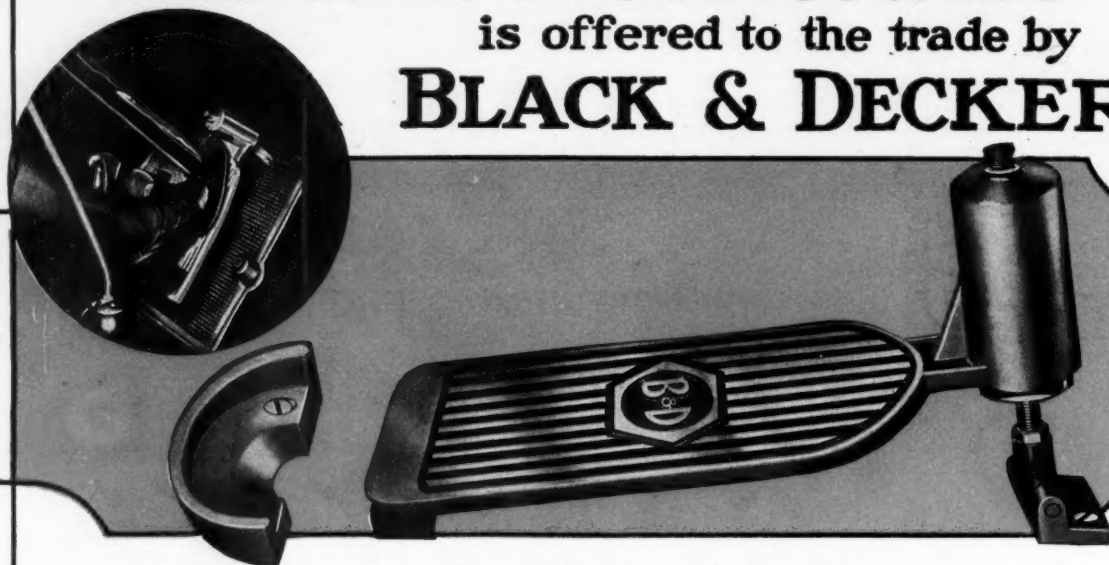
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A New Accessory  
The

# Cushion Accelerator

is offered to the trade by

**BLACK & DECKER**



DE LUXE MODEL OF POLISHED ALUMINUM, RETAILS FOR  
ONLY \$9.75

Nothing like it has ever been on the market before. We predict it  
will be one of the fastest selling accessories ever offered to the public.

**EVERY AUTO OWNER IS A PROSPECT**

**WHAT IS IT?**—The Cushion Accelerator consists of a large comfortable polished aluminum pedal, hinged to the floor or toe-board at one end and having an air cylinder at the other which operates over a piston attached to the toe-board. The pedal is adjustable and can be fitted over the standard accelerator on any automobile. The polished aluminum heel rest keeps your foot in position. This heel rest will take a lady's dainty high heel or a man's broad heel.

**HOW DOES IT WORK?**—When the pedal is pushed down the air in the cylinder is forced out through valve at top and when pedal is allowed to return air is drawn back into the cylinder. The little spring-lock valve at the top of the cylinder makes it possible to obtain just the degree of cushioning that is required.

**WHAT DOES IT DO?**—It takes the wiggle out of the ordinary accelerator and gives an even running motor over bumpy roads and crossings. It gives an even "pick-up," making it possible to take steep bumpy hills with greater ease and less strain on the motor and driving gear.

It eliminates a large part of the nervous strain of driving.

Variations in engine speed, which cannot be avoided when driving over bumpy roads and crossings, with the ordinary accelerator, produce *alternate opposite strains* on motor, clutch, transmission, universal joints, differential—because one second the motor is driving the car and the next the car is driving the motor. The Cushion Accelerator not only improves the running of the motor and the riding of the car, but it also prevents unnecessary wear on all driving parts, by eliminating a large part of these strains. It enables you to maintain a practically continuous driving torque.

**GOOD MERCHANDISING**—The woman or man who uses one will never be content to be without one, therefore, in line with the dictates of good merchandising, we suggest that every dealer put one from his first shipment on his demonstrating car and one on his show case in the special colored display board that we will supply, together with a couple dozen circulars.

It is an ideal Christmas present for the motorist.

We are following our usual policy of advertising liberally to users to help you sell.

FOR MORE COMPLETE INFORMATION ASK YOUR JOBBER OR WRITE US

**THE BLACK & DECKER MFG. CO.**

Towson Heights,



Baltimore, Md., U.S.A.

P-U-R-R-R-R-R-R-R-R-R



# MOTOR AGE

Published Every Thursday by  
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## Prepare Your Customers for Winter Sell Them Top Dressing NOW

Most tops and side curtains are gray, dusty and leaky from the summer's heat and dust. All your customers need is just a suggestion—ask 'em to buy Johnson's Black-Lac now.

## JOHNSON'S BLACK-LAC

### The Perfect Top Dressing

Johnson's Black-Lac is easy to apply. It dries in fifteen minutes and will not rub off on the hands or clothing. It is permanent, waterproof and inexpensive. It acts as a preservative for the finest leather, making all top materials soft and flexible.

It takes no experience to use Johnson's Black-Lac—all they need is a brush and an hour's time. It gives perfect satisfaction on any kind of a top—leather, imitation leather or mohair. One coat imparts a rich, black surface—just like new.

### You can make extra dollars

by giving your customers service on redressing their tops. Any one can easily do the work satisfactorily with Johnson's Black-Lac.

There is a good margin of profit to the trade on Johnson's Black-Lac and every other Johnson Car Saver. Write for our book on "Keeping Cars Young."

## S. C. JOHNSON & SON

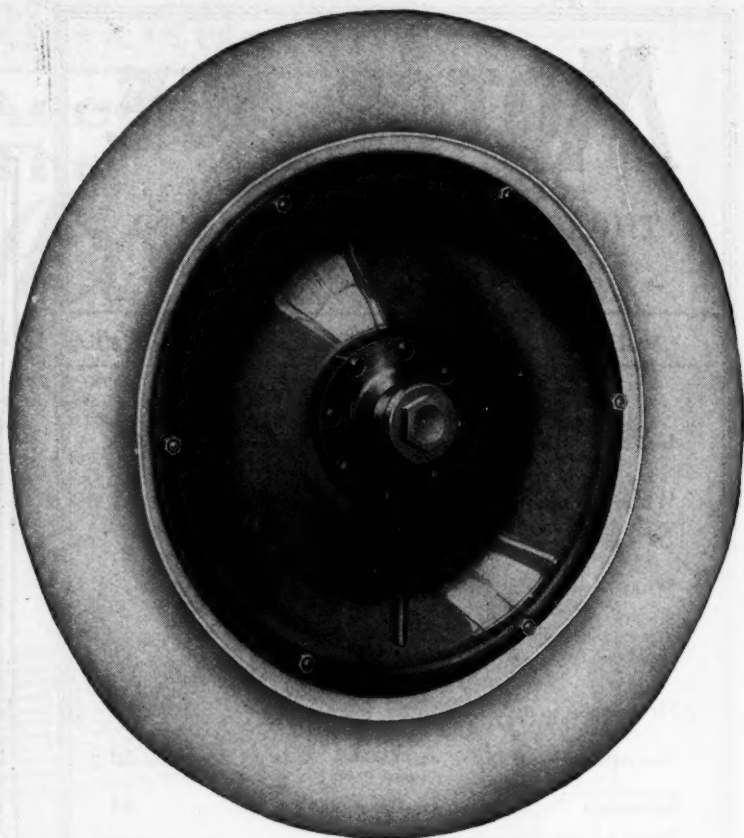
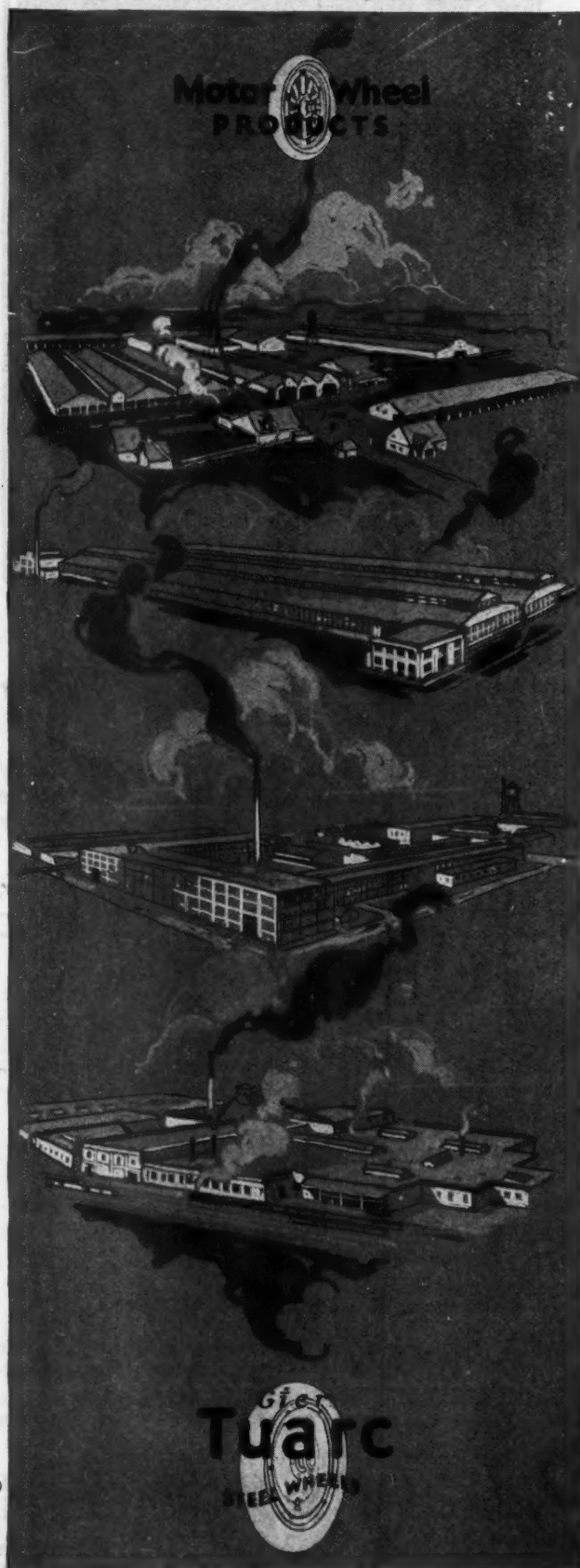
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Wisconsin

# Gier Tuarc

## STEEL WHEELS



## The *Experience* that Joined Wheel *Utility* to Beauty

The makers of Gier Tuarc Steel wheels *know* wheel science—these great plants produce millions of motor car wheels annually.

The makers of Gier Tuarc Wheels *know* steel wheel stamping—"Gier Stampings" is a name which stands for the solution of many of the most intricate and difficult metal stamping problems which have arisen in the industry.

From this matchless experience you gain invaluable, tangible wheel betterments when you equip your car with Gier Tuarc Steel Wheels.

They come with hubs which fit your car instantly, avoiding the delay and expense of obtaining and fitting special parts. They preserve for you all the convenience of demountable rims—you change tires without changing wheels—you profit from the need for only four wheels.

You inflate tires easily and sensibly through the accessible *outside* valve stems on Tuarc Wheels. This is another of the advantages resulting from Tuarc compound-curve construction.

This unique design means strength, lightness and stunning beauty that smartly sets off cars of every type.

Such notable selling advantages; the powerful organization behind Tuarc Wheels, and the broad-gauge sales policy command the interest of every foresighted distributor, seeking a profitable, permanent, substantial connection. Write us now regarding territory.

**MOTOR WHEEL CORPORATION, LANSING, MICH.**

*Motor Vehicle Wheels Complete — Metal Stampings — Steel Products*



# MOTOR AGE

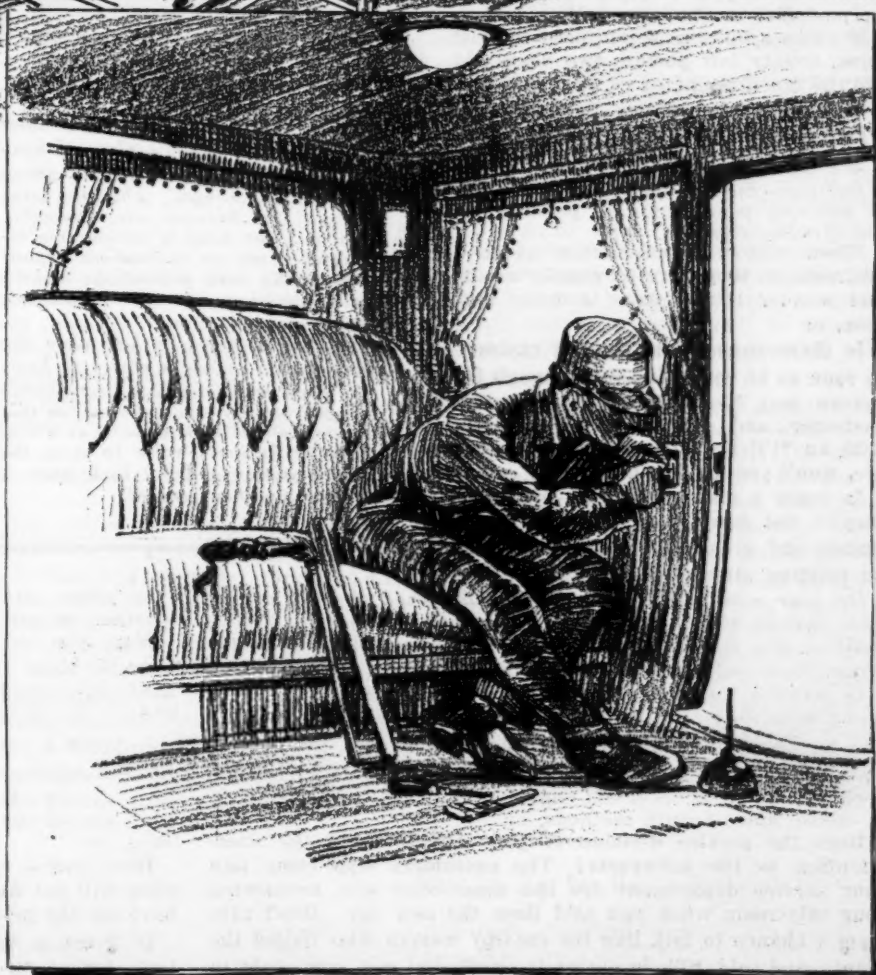


## Why Do They Do It?

**W**HEN a piano concern sends a service man up to a man's home to repair a \$1500 piano that service man is neatly dressed, keeps his tools and equipment in a neat case and is considerate of his surroundings. He knows he is in someone's home and respects the surroundings.

The same man who has a \$1500 piano repaired may need some repair work on his sedan, which cost \$2500 or over. Suppose one of the switches inside the body, or a door lock, does not work. What happens? A greasy mechanic plants himself on the broadcloth upholstery and lays his tools and a leaky oil can on the velvet carpet.

Why the difference in treatment of a man's property, especially where the car usually costs much more than a piano? The better operated shop will take this into consideration, and must do so, if it does not want to be classed as "just another garage."



# Is Yours "Just Another Garage?"

*Or, Is Your Place Operated on Such a Basis That It Commands the Respect of the Community, the Same as Any Other Well-Conducted Business?*

By B. M. Ikert

**I**S YOUR place of business looked upon by those in your community as "just another garage," or

Do your customers and other people in the town point to your building and say, "There's the service station, or maintenance division, of the Runwell Motor Car Co.?"

Is yours a place of business off somewhere on a side street where it's easily forgotten, or

Are you prominently located on Main street, and is your business taken seriously along with that of the dry goods man, the hardware merchant and the druggist?

Does your building still look pretty much like the livery barn it was in the old days, or

Have you cleaned house, and do your customers feel the same about your institution when they enter it as they do in entering the bank, the postoffice or the town hall?

Is yours a building all littered up with signs, county fair posters two years old, and the faded remnants of what was once a sign painter's banner announcing a price change in the car, or

Are there in your place of business just a few well-rendered signs for the purpose of directing your customers properly and not offending them?

When customers enter your place of business, do they have to wander around and wonder if the place is doing business, or

Is there someone to meet a customer as soon as he comes in—even though this person may be waiting on some other customer and has to excuse himself with an "I'll be with you in just a minute, won't you sit down, please?"

Is yours a place where the men when they're not busy hang around the entrance and give the place anything but an inviting atmosphere, or

Do your men put in their time to advantage cleaning up the place, making special equipment, overhauling machinery and tools, studying new methods, etc., and do they know their place in the organization and plan their actions accordingly?

Is yours a building with the salesroom "all dolled up" with fancy woodwork, tile floors, a forest of palms and shrubbery and a cherub in white Italian marble, but with the service station in the rear "sporting" the same old unpainted rafters, pools of oil on a cheerless cement floor, dirt—and plenty of it—noise, and uncouth methods, or

Does the service division of your business get the same attention as the salesroom? The customers who come into your service department are the same ones who frequented your salesroom when you sold them the new car. Don't give them a chance to talk like the gossip woman who visited the Blanks and said, "Their parlor is swell; but gee, you ought to see the kitchen."

Is your service department run on a hit-and-miss, don't-care, "Doesn't make any money, anyway," sort of a basis, or

Can you produce at any time a record sheet, showing the exact status of the service department, with perhaps a curve plotted to indicate the trend of your service work for the past few years? Do you know where you stand?

Do you look upon the factory service bulletins and suggestions as so much "bunk" and do your men say, "Those fellows in the factory sit at their desks all day—what do they know about servicing cars," or

Does your foreman, service manager or you yourself take all the information from the factories seriously and attempt to sell the mechanics on the value of it, and find ways and means to put into effect all or as many as possible of the suggestions for the betterment of the service work on the particular car in question?

Is yours a service station where all the good work a mechanic might have done on a customer's car is nullified when, in the delivery of that car, a careless car shifter has smeared up the steering wheel so the owner soils his or her hands, or

Have you installed a system whereby you **KNOW** that when a car is turned over to its owner the wheel, seats, doors, and other parts are free from dirt and grease?

Is yours just another "garage" where mechanics are of the hammer and wrench variety, using the wrong tools for the job, or

Is yours a shop where the men take pride in their work, use a wheel puller when a wheel puller is necessary and a magneto wrench when it is necessary, instead of hammer and pliers?

Is yours an institution where the employees do not care whether school keeps or not, just so they hold their jobs, or

Have you, as an executive and business man, pointed out to them the value of each person to the organization, and that teamwork and concerted action is necessary for retaining the good will of the customer and getting repeat sales?

Is yours a place of business where there is one set of rules for the salesmen in the front office and another for the fellows in the shop? Are the boys in the shop instructed to keep out of the salesroom, but the salesmen allowed in the shop, or

Have you so planned your organization that the men in the shop will not feel offended and get the idea that the salesmen have all the privileges while they enjoy none?

Is yours a business run on the old idea that there must be a lot of "free service" and a lot of concession must be made to get a customer's check for a new car, or

## Service Station or Garage?

**M**OST people when they take their cars to a dealer's place of business for repairs say they are going over to the "garage." Thus the term "garage" has become one applicable to almost any kind of automotive institution from an out-and-out repair-shop to the most pretentious maintenance division of the automobile dealer.

But the dealer who has taken the serious side of his business to heart will have eradicated the discreditable things from his establishment, so that customers will look upon it as a real place of business, refer to it as the service station and not look upon it as "just another garage."



*Have you taken steps whereby the new owner knows that when he gets his new car it is in perfect condition, and that maintenance starts from that time on, and that if he wants a motor-meter you are not going to "throw it in," but that he will have to pay so much for the device, INSTALLED? When you buy a lathe for your shop, does the lathe maker say, "We will give you a tool post grinder with the lathe"?*

Is yours a place of business that just takes in whatever work comes along and does not know how many of the cars of the make you handle are being serviced, which logically should be serviced, or

Have you organized to such an extent that you have at your fingertips the names of all the owners of the car you handle, and do you know just how many of them come in for service, how many stay away, and why? Potentially, you ought to get a certain amount of service work out of your territory, but do you?

Is yours "just another garage" where the car owner when he comes in for his car is all prepared for a fight about the bill and does he go away with the words "robbers," "gyps," "crooks" and others running through his mind, all the time building up resistance, or

Is yours a service station employing systems and methods whereby the owner either knows exactly what the job is going to cost him, or whereby you have an understanding with him before the job is touched?

Is your organization such that the salesmen make all kinds of excuses to customers for "the poor service," "We can't get good men," etc., or

Is your organization such that the salesmen, instead of making excuses to the customer, try to sell him on the service department, if the department is entitled to it?

Is yours a place of business about which a woman driver remarks, "I don't like to drive over to that garage, it's so messy around there," or

Is yours a service station into which the woman driver does not mind entering, any more than she does into a department store—in which she does not have to wander around and ask, "Is there someone who will please wait on me?"

Is yours a shop trying to operate on a scant supply of equipment, where the men have to stand in line waiting for a chance to use some machine or tool, or

Have you so planned and equipped your shop that there is no delay and confusion? Have you thought of individual benches for the men, engine stands, cleaning vats, individual motor-driven machinery instead of line shafting? Is the shop well lighted and are the working conditions pleasant? The men in the shop are human, like yourself.

Is your method of charging for service work such that it breeds dissatisfaction all around, or

Is the flat rate method or some other good method of selling service work used, whereby there is a definite line of operation to follow from the time the car comes in to the time when the bill against it is paid and the customer drives it away?

Is yours just another garage, supposed to repair cars, sell gasoline and oil, never close up nights, Sundays or holidays, or

Is yours a business like others in town, observing regular opening and closing hours, Saturday afternoons off for the men in the shop, closed at night, etc.?

Is yours an organization where the men never get together and discuss ways in which the business might be better handled, where the salesmen cuss the service men and vice versa, or

Have you assumed the part of a leader and gotten your men together once a month to discuss things of vital importance to the welfare of the business, as a whole, and the men connected with the organization, from the chief executive down to the grease hound?

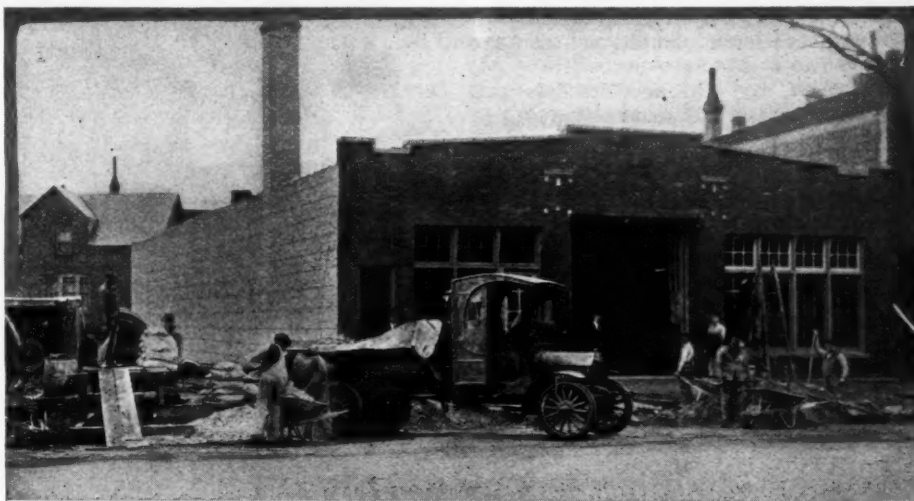
Is yours a place which does not support the trade papers

devoted to the business in which you are engaged, and doesn't your foreman or service manager study those periodicals and books which deal with better business methods, or

Is yours a place of business which supports the trade papers and sees how much of what is contained therein can be used to advantage? And does your service manager or foreman hold weekly meetings with the men to point out to them some pertinent subjects on which the trade papers might dwell?

Is yours a business in which the term "overhead" never has been explained to the people in the organization, where wasteful methods are employed and where excesses of all kinds are tolerated, or

Is it a business wherein the greasehound knows that to leave lights burning unnecessarily simply means so much money out of the cash register, which might have been partially added to his wages? Is it a business where attempts are made at all times to cut down costs, by doing repair jobs correctly the first



If you have just finished a new building, or are about to erect one, how are you to know if people will refer to it as "just another garage"? Your policy and methods of transacting business will soon tell the story

time, and by the people in the organization having the right mental attitude towards the business and the customer?

Is yours a business going on in the same way it has done up to this time, without planning for future business? Is anything being done towards making an analysis of the surrounding territory? What do you know about the section of the country in which you are doing business? Is yours a business which never goes outside its own immediate sphere of activity, or

Is it a business which knows "where it is going from here?" Have you made maps of the surrounding country? Do you know the number of cars in your county, the number of trucks, the tractors, the wealth per capita, what the chances are for good roads in that county next year, what your commercial club is doing, your dealer organization, whether or not the school system is going to put in buses for the children, who is going to get the maintenance work on these, etc.?

If yours is not just another "garage," you will have paid attention to the things mentioned above. You will have left the impression on those in your community that yours is a business for the selling and maintaining of automotive vehicles. It is distinct from the garage, which primarily is a place for storage. It's a real business, Mr. Dealer—but whether or not folks in your town think so depends greatly on how well you have eradicated the term "garage" from your business.

## One Way to Get Business

"How do you find business?" asked one manufacturer of another when they met.

"By looking for it," was the unexpected answer.

## White Company Designs a Car for Business

**T**HE Business Car recently placed on the market by the White Co., Cleveland, was designed to make an appeal to the salesman who covers a territory made up largely of small towns. Foremen and superintendents of utility companies who are doing extension work in several localities at one time; mining, oil and logging companies whose men must travel about in rough country in all weather; cattlemen with extensive ranches; road contractors, inspectors and insurance men; cotton growers and others with scattered plantations, also are expected to provide prospects.

The new car will accommodate two persons. It has a four-cylinder engine and the list price is \$3225. At first glance the new model gives the impression that the company has returned to the passenger field, but such is not the case. While the business car has the appearance of a passenger model, it is of truck construction, combining the rugged qualities of a truck with the comfort and trim appearance of a touring car.

The new car is a well-equipped model. The drop door closes tightly, keeping out the dirt. A gutter protects the inside from water running off the deck. Suitcases are carried in a compartment between the driver's seat and the rear deck.

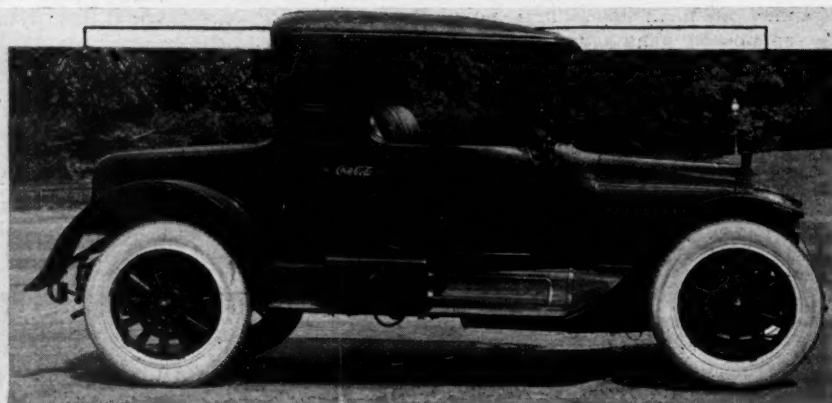
A description of the chassis follows: 119-in. wheelbase, 30-hp., 4-cylinder monobloc motor of L head type; a 5½-in. stroke, 3¾-in. bore, single high tension ignition, gravity and splash lubrication, plate clutch operating in oil, four-speed selective type transmission driving direct in third speed; White special type of rear axle; strongly trussed, pressed steel frame; semi-elliptic front and three-quarter elliptic rear springs; wood wheels; tires 34 by 4½ in. cord, plain or non-skid; 12-volt electric starting and lighting system; vacuum gasoline feed from tank in the rear; capacity, 17½ gal.; 56-in. tread; service break, external contracting, emergency, internal expanding, both acting upon rear wheel drums.

The seat is trimmed in black, hand-buffed leather in French plaits. Cushions are built up with coil springs and No. 1 gray hair. The door is trimmed with plain black hand-buffed leather. There are large pockets in the door. Pantasote curtains with celluloid windows are part of the equipment. Door curtains are fitted and ironed to open with the doors. The panels are either aluminum or steel.

There is a cowl dash with sloping bonnet.

The standard limousine type of windshield is used, and it is bolted to the cowl. The upper half of the windshield is adjustable for ventilation.

There is space for two suitcases in a compartment which is provided back of the driver's seat, and it is accessible from



Two views of the White Co.'s new business car. The rear compartment will be found convenient to carry business equipment

the seat. In the rear deck, accessible through a door of full width, is a compartment designed to enclose whatever material is carried. The compartment contains three drawers, each 3½ in. deep, and measuring 54 by 30 in., 57 by 30 in.

and 60 by 30 in., respectively. The equipment that goes with each car in addition to electric lights and starter are extra rim, tire carrier, tire pump and tire repair outfit; license brackets, jack and full set of tools.

### Present Essex Shows Accumulation of Engineering Refinements

**T**HE present Essex car, although quite different from the Essex of a year ago, has not been subjected to any notable change at any one time, but with the incorporation of the most recent improvements, the total changes amount to practically a refined model. Probably the most important changes are the new cylinder heads and the new pistons.

The cylinder head has been redesigned particularly with the idea of giving more combustion space over the exhaust valves. A pocket is provided in which the plug is placed. This completely isolates the plug from any location which is apt to be in the path of an oil throw, and prevents fouling.

The intake passages are now arranged to give greater turbulence to the gases. The intake manifold now incorporates hot-spotting features, due to the arrange-

ment of the water passages which are designed to permit higher temperature at certain points where it will assist in the evaporation of the fuel. The aluminum pistons are the diagonal-slit, constant-clearance type with three rings above the wrist pin instead of two, as in the old model. The pistons are split in such a way as to give a modified slipper effect.

Due to changes in the chassis oiling scheme, and the use of oilers instead of grease cups, the exhaust pipe has been altered to clear the oilers. A new muffler has been fitted, incorporating a double cone expansion chamber, and the springs have been regrated to improve the suspension. The Stewart-Warner vacuum tank is employed and the body finish is blue, giving an alteration in the appearance of the cars.



## New Essex Coach Only \$300 More Than Touring Model

**P**RICED at \$1495, the new Essex Coach, which is just in production, incorporates a number of economy features in enclosed body construction. This price, which is \$500 below the price of the sedan and but \$300 more than the touring car, indicates that something has been done to cut the cost on this body, and a large part of the secret is in the elimination of curved pieces of wood. The sedan is continued at the old price, \$1995. With the exception of two pieces, every piece of wood in the body framing is cut on a straight line. This not only materially reduces the cost in



Interior of the new Essex coach. Fewer curved lines reduce cost

preparing the wood framing for assembly, but also in a number of instances has resulted in making the assembly work much easier and far more readily handled on an interchangeable basis.

An additional saving has been made in the use of two doors. This has been made possible by the adoption of individual Pullman seats in front in place of the usual fixed type of seat, these seats folding out of the way, allowing access to the rear seat. The car is a five-passenger design, the rear seat being continuous across the body in the customary way.

The usual window framing has been eliminated and in its place the felt liner method, which is old in coach work, has been adopted. The glass operates between two fixed lining strips of felt and this not only assists in supporting the glass, but also is an anti-rattling feature. The window regulators are of the Dura skew gear type with a worm for the actual lifting of the windows. The crank operates the worm through the medium of the skew gears.

By reason of the construction of the body, it is possible to put it together in a number of sub-assemblies. The body may truly be said to be assembled instead of built up, as in the usual type. For instance, there is no great amount of tacking to be done from the inside of the body. This can practically be all done before the body is put together.

### This Company Believes in Making Service Foremost

**W**E LOOK forward with optimism to the coming winter as an excellent season for service and sales. As we progress in business, we become more and more impressed with the inseparability of service and sales, and we therefore propose to concentrate our efforts upon perfecting our facilities for service this winter, in the firm belief that a reputation for reliable and intelligent service is an invaluable asset in gaining sales, and infallibly productive of results.

We believe in trying the reverse of the popular opinion that sales of automobiles

cause the service department to prosper, and to prove that service brings sales, and that far less grudgingly and to profit by both principles.

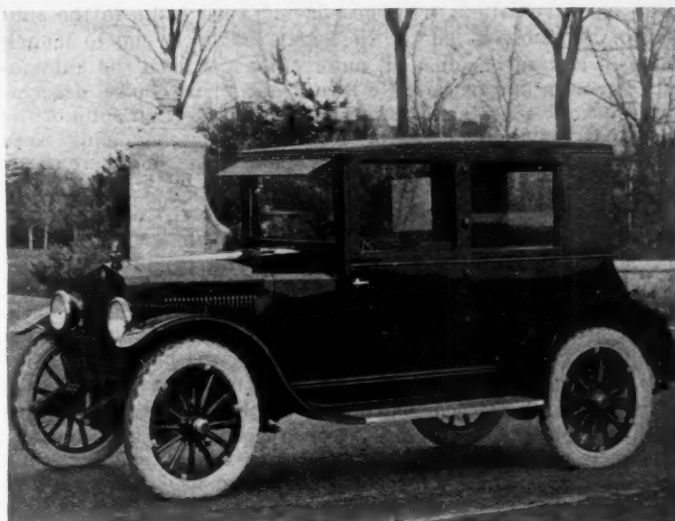
"With the 1922 models on hand to place before our prospects who keep their cars in active service throughout the winter, and a well equipped and well prepared service station to inspect, tune up and overhaul the cars of those who lay their cars up over all or a part of the winter, we expect to find abundant opportunities for a good business over the winter season.

The roof furnishes a good example of this method of construction. The entire roof is practically a sub-assembly. It is a soft type covered with artificial leather. The actual ceiling of the car, or, as it is known, the roof lining, is stretched across the top of the body before the roof proper is put on. This permits of tight fitting and does away with a good part of the usual interior tacking and trimming work. The roof is then put on over the top of this lining, as an independent assembly.

Additional economy has been secured by making as many parts on the body of the same dimensions as possible. For instance, all four window frames are of the same size. This also means that the four pieces of glass for the side windows are identical and, consequently, there is no fitting of left and right in putting the body together. All of the plaited upholstery is detachable. The upholstery is a wool cloth with plaited back and seat cushions in the rear seat.

A sales executive of the Essex company states:

"The idea behind this car has been to produce a good quality job without going to the expense to carry out some of the details in coach work which are more the results of precedence than of necessity or even ornamentation. For instance, instead of going to considerable trouble and expense to cover the heads of the screws, all of the screw heads are exposed. While the manufacturer of an expensive aluminum body would not tolerate this type of construction, it can be stated that it is



The new Essex coach which is but \$300 more than the touring car

far from displeasing to the eye and certainly results in considerable saving in manufacture, which, of course, is what has been aimed at in this body, in which an attempt has been made to provide a closed body at open body figures. The finish has not been slighted, as there are twenty-five paint operations, this being fully up to the normal number."

"As a helpful hint to others, we wish to say that with the coming of the first cool days this autumn we received numerous complaints on cars being hard to start in the mornings, and sluggish-running. We found that this difficulty almost invariably yielded to a slight adjustment to winter running in the carburetor, and to cleaning both the carburetor and vacuum tanks of the accumulated water and slime. This procedure invariably proved to be an effective cure."—R. N. Shyder, Kanawha Haynes Co., dealers in Haynes, H. C. S. and Oakland Motor Cars, Charleston, W. Va.

# What You Must Sell With *the* Car

**D**ESPITE the near perfection of the automobile, it is not yet as perfect as the buyer expects—The customer is buying transportation and he must be sold on a transportation basis.

By Ray Cunliffe

Recently General Manager, Cadillac Motor Car Co., Chicago Branch

**I**N the olden, golden days, before the Ogre of Eminent Respectability descended upon the land, a group of convivial souls chanced one evening to be assembled in the Tap Room of the Manufacturers' Club. During the course of general conversation, reference having been made to the subject of automobiles, one of the party took occasion to launch forth in a tirade against all automobile men, and the automobile business in general. He loosed not a few choice, descriptive epithets, and his presentation of the subject, in spite of the fact that his impressions of automobile merchandising were very distorted, proved very amusing indeed to the group about the table.

The narrator pictured himself as a buyer walking into a beautiful salesroom with handsome automobiles standing on the floor, and a surrounding atmosphere of oriental rugs and period furniture, with dapper, cigarette-smoking salesmen draped in semi-recumbent positions on fenders and tables. Every provision for the comfort and convenience of the prospective buyer was in evidence. A car to waft him to his home was waiting at the door. The sales manager greeted him effusively, and proceeded to dilate on the wonderful qualities of the "Pepperton" Six. Mr. Buyer, hypnotized by the elegance of the surroundings and the eloquence of the salesmanship, soon had his name on the dotted line, and in a few days was the proud possessor of the latest "Pepperton" Speedster.

The sad denouement came just a week later when he made his first visit to the service station. What a disillusionment was his, and with what a terrible thud he sank back to earth! He found himself compelled to thread his way up a crowded alley into a dingy garage, where a crew of greasy, boisterous mechanics wandered aimlessly about, or shouted back and forth to each other from dark adjoining recesses, and where, strange to say, nobody seemed to take the least interest in him.

It was only after futilely making known his wants to half a dozen persons that he secured anyone to listen to him at all, and then he left his car with no satisfaction other than that of seeing it thrust back into a corner, with the vague promise that he would be notified when the work was completed. From the general attitude manifested, he had his doubts if it would ever be completed, and as he rode in a taxi back to his office, a changed and saddened man, he tried in a bewildered fashion to discover the cause for the sudden and absolute cessation of all that interest in his welfare which had been so enthusiastically manifested a few days before.

In the brief period of transition from prospective purchaser to proud owner, some subtle, occult change had taken

place, and from being a subject for solicitation, he was now regarded as merely a "service pest."

The teller of the story contrasted this experience and the attitude of the service department with the atmosphere of the salesroom and the grandiose reception accorded him when he purchased his car. He concluded by wondering sarcastically what would have happened had he sent his wife or daughter with the car into that same service station.

Such comment, bearing evidence though it does of a fundamental misconception of the automobile business, especially of the merchandizing end of it, may well furnish food for thought for every automobile merchant in the country. They have reason to treat it seriously and reflect on the fact that such opinion of automobile service existed, and still exists in some degree, in the minds of far too many automobile users the country over. For while this portrayal of a buyer's experience did actually fit some so-called automobile businesses, it is, of course, grossly exaggerated when applied to the industry as a whole today.

Every business has its fakers and irresponsible merchants. They are in the furniture, jewelry, piano, clothing, banking, and all other lines of business. But the buyer of an automobile who has the sort of experience pictured above has only himself to blame, and deserves very little, if any, sympathy. The critic in question had never owned a really first-class automobile, and yet he was willing to measure the entire industry by the service rendered in the fourth-rate establishment where he purchased his car, and where, undoubtedly, he received some compensating inducement in the way of an exorbitant price for his old car, or a collection of miscellaneous equipment "thrown in."

The general progress of the automobile industry has been matched, stride for stride, by the development in automobile sales methods. The day of the type of salesman who viewed the automobile business as a "sport" and a "game," who frequented matinees and adopted affectations, has long since passed, and in his place are energetic, intelligent, forward-looking men of sound business judgment and unquestionable integrity; men of as high character as are to be found in any business.

When an automobile dealer sells a car, he places at the disposal of the buyer a subsidiary commodity commonly known as "service." There is no automobile term so abused and none regarding which there is less stability of thought, but nevertheless it has become one of the most important phases of the automobile business, involving considerations found in no other line of retail or whole-

## Where the Value Lies

**T**HIS article was written for "The Manufacturer," which is the house organ of the Manufacturers' Club of Philadelphia. This publication circulates among men of means and intelligence, all of whom ride in cars, so it is very nearly an owner article. It might not seem to belong to MOTOR AGE pages and it does not unless you read out of this story what a very successful dealer is selling with his cars. The writer's title for this article was "A Plea for Mutual Understanding."



**sale merchandising.** There are many automobile owners who think the average automobile establishment, except in its sales department, is a most inefficient organization. To listen to their contentions, one would be compelled to believe that repairshops were universally manned by congenital incompetents, and that the job of every foreman was to aid and abet in the criminal process of abstracting money from the patron's pocket.

It is true that in the earlier days of the industry, service was rendered on rather a hit-or-miss basis, but today there are as many reputable and progressive executives in the automobile business as in any other line of merchandising, and they have built up highly efficient organizations, capable of rendering the highest quality of service.

The automobile dealer today realizes that his service department is as important as his sales department. He mans it with equally capable men, and equips it with every possible labor-saving device to promote efficiency and lower the ultimate cost of service to the purchaser. The importance attached to adequate service facilities by the modern automobile company is well illustrated in one establishment specializing in a single passenger car, where out of 160,000 sq. ft. of floor space, 130,000 sq. ft. is devoted to the servicing of cars in the hands of owners. Service stations and equipment costing more than half a million dollars, in many large cities in the country, give substantial proof in themselves that the importance of this end of the business is keenly recognized.

#### LESSON LEARNED FROM JEWELER ADAPTED TO THE AUTOMOBILE BUSINESS

FOR several years the manager of an automobile concern had been carrying a cigarette case which he prized highly. From constant use it had become both dented and sprung. The silver had become tarnished, but it continued to serve its useful purpose of carrying cigarettes until one day the spring controlling the clip which holds the cigarettes in place broke, and it was necessary to send it to the jeweler for repair. He took it to the best jewelry house in the city, and told them to repair the spring.

Some time later a case was delivered to him in a beautiful box, neatly wrapped in blue paper. He had quite forgotten the matter, and wondered, upon opening the package, who was sending him a present. Imagine his surprise when he took out what was formerly his old cigarette case and found that not only had the spring been repaired, but the case had been trued up, the dents hammered out, and the surface repolished. It looked like a new one, and he felt proud of it because he had not considered it could be restored to such an appearance of newness. The thought immediately flashed through his mind, how much an automobile owner would appreciate the same interest being taken in the car he leaves at the service station for readjustment. By capitalizing upon this lesson and applying it to his business, there has been achieved in this establishment a quality of service which must eventually be practiced by all progressive companies.

Many an owner, after an expenditure of four or five hundred dollars for repairs to his engine or chassis, may rightly wonder, when he takes hold of a greasy steering wheel and looks out through a grimy windshield, if the company has no pride in the automobile—their own product—of which he himself is so proud. He wonders if the work has been as slovenly performed as the slovenly appearance of the car indicates.

It is encouraging to know that such negligence and carelessness occur less frequently in first-class service stations today, and that the better automobile companies, in emphasizing the importance of just this angle of their business, are steadily and surely approaching a state of perfection in their service departments in every way comparable with that of the jeweler.

It is a more difficult problem, however, to achieve in an automobile service department this high degree of workmanship and attention to detail. In the repair of an automobile, despite the most careful supervision and the most elaborate inspection systems, confidence must be placed in the efficiency, honesty and thoroughness of the individual mechanic. Many times the work cannot be checked at all. For instance, in oiling and greasing a car a checking of the work would practically double the labor involved.

A solution of the service problem has been secured by its elevation to a more efficient plane through properly departmentalizing and standardizing repair work. An automobile repairman used to be more or less a jack-of-all-trades. He was expected to handle repairs and adjustments from radiator to rear axle. Nowadays, in the first-class automobile establishment, there are few general mechanics. Specialists have been developed who are experts on certain portions of the car. Far from adding to the expense, this specialization of labor promotes efficiency and reduces the final cost to the automobile owner, although it explains why, when a car is brought to a service station for a day of eight hours, as many as eight or ten men may work on it, expending a total of perhaps twenty hours of labor.

In the employ of a modern service station nowadays will be found skilled craftsmen in many trades, including tool makers, machinists, blacksmiths, electricians, sheet metal workers, cabinet makers, upholsterers, watch makers and painters, all of them experts in their respective lines. As a result, the automobile owner today can secure a quality of service for his car which was not considered within the realm of possibility a few years ago.

The average automobile owner in most cases does not question the price of work, provided it is properly done. He recognizes quality, and is willing to pay for it. Certainly, there will always be those who, from a false sense of economy, will persist in taking their cars to a corner garage, and there turn them over to the tender mercies of a jack-of-all-trades repairman. It does not require the services of a mathematician, however, to determine the probabilities of securing permanently satisfactory results.

Why the ordinary buyer does not investigate more thoroughly the facilities for service when he purchases his car is a great source of mystery and is utterly unexplainable to the company that has had the foresight and energy to place the proper stress on the importance of this end of its business. But he does not, and will not, until forced by the hard facts of his own experience to give some consideration to the subject.

Too often the manufacturer and dealer are made the objects of a great amount of severe and unjust criticism—criticism which is eminently unfair in that it places upon them responsibility for things quite beyond their control.

#### BIG REPAIR BILLS OWING TO NEGLECT OF CARE DUE ANY PIECE OF MACHINERY

LET us, for a moment, analyze, by way of illustration, what happens when an automobile passes out of the dealer's hands into possession of the user. In the first place, the average man or woman purchases a car today with very little thought of the mechanical details. We have, then, a really complicated mechanism placed in the hands of an individual who has no knowledge of machinery.

While the automobile of today, thanks to unwearying efforts on the part of earnest manufacturers, is almost fool-proof and requires practically no mechanical ingenuity for its successful operation, yet it is patent that an automobile driver should have at least a superficial knowledge of the functions of the various groups of parts, and a bowing acquaintance with the parts that need lubricating. A man who purchases machinery for his factory, costing as much as he pays for a first-class automobile, employs a skilled operator to study its operation, lubricate it properly, and interest himself generally in its care and cleanliness. While it is not the intention to infer that an automobile needs as much attention as the machinery, it is true that if even a small percentage of this care were bestowed on the automobile, repair bills would be cut down at least sixty-six and two-thirds per cent.

The automobile driver pays dearly for his ignorance and indifference, and the amazing part of it all is his unwillingness to learn.

Take an everyday happening as an example. Mr. Business Man walks into the X-Y-Z salesroom and buys their latest model, a beautiful speedster, glistening in its carefully polished coat of paint and nickel. He has read of its ability to do seventy miles an hour. He gets into the car, grabs the wheel, and with a feeling of pride and eagerness starts out to test the power of the engine humming beneath the hood. Disregarding the fact that he has beneath him a machine with parts

fitted to limits as fine as a half-thousandth of an inch, that should be carefully "run in" for at least five hundred miles, he looks for a stretch of good road and proceeds to "hit it up" to a forty or fifty-mile clip. It is a tribute to the manufacturer that he does not burn out the bearings. His rashness may, however, cause a condition which shows up in the later life of the car in the shape of scored cylinders, damaged bearings or warped valves.

Or, he starts on a week-end tour on a blistering hot summer afternoon, which takes him over a limestone road from which a cloud of fine dust arises to cover his car. A shower of rain is encountered, and the chemical action resulting from the hot metal, lime dust and rain seriously affects the paint on his car. This condition, unfortunately, may occasionally be encountered in touring. Nevertheless, three or four months later, when the finish has grown dull from such usage, he brings the car back to the service station and demands a new coat of paint, no charge.

It is indeed surprising, the abuse to which many motorists subject the paint on their cars. The best paint, especially when applied to aluminum, may crack and peel off a car when suddenly exposed to zero weather after standing many hours in a warm garage—a fact which the average automobile owner does not stop to consider. It is actually pitiable with what indifference the average owner will stand by on a garage floor and view the washing of the beautifully painted, highly polished surface of his car by a washer with a dirty sponge and a filthy chamois.

It may be that the car is driven in after a long, hard winter day's run, and, while the engine hood is still in a heated condition, is rolled immediately over a wash rack, where a stream of ice-cold water from a hose is directed against it. This procedure can have but one result—immediate and rapid deterioration of the paint, especially on the hood; and the surprising part of it is that the blame in many cases is put back on the manufacturer. In his claim for redress the complaining owner always cites as an example the paint and finish of his neighbor's car, of the same make, purchased about the same time, apparently not realizing that his neighbor may have given unusual consideration to the care of his car to preserve this beautiful finish.

#### INADEQUATE LUBRICATION THE CAUSE OF THE MAJORITY OF MOTOR CAR ILLS

**P**ERHAPS the car is driven through mud and sand, until it is hardly recognizable as a new car. The owner then turns it over to a garage to be washed and polished. It gets a superficial, external cleaning, and when he calls for it in the morning it looks spick and span again. Yet in the cleaning, the mud and dirt embedded in the brakes and underparts of the car have not been removed, and when the brakes fail to function properly, or some other difficulty arises, the owner makes acrimonious comment on the fact that a trip to the repairshop is necessary.

Over conditions such as these the automobile manufacturer has absolutely no control; yet Mr. Buyer unreasonably demands redress. Granted that the average automobile user is reasonable, there are too many who are prone to place the blame for the improper performance of their cars upon the manufacturer or the service station, rather than upon themselves, where it rightfully belongs.

In a recent conference of the heads of the mechanical departments of an automobile company the question was asked, what percentage of cars brought into the service station for repairs were there solely as the result of inadequate lubrication. The lowest estimate was fifty per cent, the highest, ninety per cent. And yet, the fundamentals of oiling an automobile can be mastered in a very few moments, and the actual process itself is one of the simplest.

One of the greatest causes of misunderstanding between the automobile service station and the owner is the latter's unwillingness to go into the details of the work he actually desires performed on his car, and the resulting general vagueness of his orders. It is often almost impossible to secure specific instructions as to just what work is required, and the amount of money the owner expects to spend. Every day, in every service station in the country, some owner leaves

his car with orders to "overhaul it and make any necessary repairs."

Now his opinion of what are necessary repairs and the opinion of an expert automobile diagnostician may be two vastly different things, representing a difference perhaps of two or three hundred dollars in the cost. For example, in a car driven fifteen or twenty thousand miles, a few minor adjustments to the motor may be all that are necessary to continue the car in operation, and yet, measured by the standard of a new car, as demanded by some very particular drivers, there may be a number of parts with sufficient wear to warrant their replacement. Just where shall the service station stop? By making a careful test of all large jobs before the work is started, and referring an accurate estimate of costs for the approval of the owner before proceeding further, the answer has been found.

#### IMPRESS THE OWNER WITH THE OBLIGATION HE OWES THE MAKER IN REASONABLE CARE

**F**OR failure to educate the public more thoroughly in the practical details of automobile operation, and to impress upon the owner his responsibility for the car's continued untroubled performance, the average manufacturer is, perhaps, to be criticized. Automobile advertising, being written from the angle of selling cars, has minimized the owner's part in their successful operation, and the resultant erroneous conception has created a problem for the automobile dealer.

The average purchaser of a new automobile, it must be remembered, is a man who has previously owned one. It is the consensus of experience, unbelievable though it may seem, that he never takes time to look at the instruction book which accompanies his car. In instance after instance there is found, in cars turned back in trade, the book of instructions in its original envelope, lying at the bottom of the tool kit, untouched. Because of this unwillingness on the part of the purchaser to take the trouble to search out his instruction book from his other equipment, some automobile houses have found it necessary to send it to him through the mails, accompanied by a letter pleading with him to read at least certain pages that have been marked.

The president of a large automobile factory asserted the other day that if he were an automobile distributor he would make it a point to talk to the purchaser of every new car along these lines:

"Mr. Smith, we are placing in your hands an automobile of which we feel very proud. The best thought of our engineers has gone into it. We have done everything possible to make it fool-proof. But from this time forward our reputation is in your hands. I say this, because, after all, the most valuable asset to our business is the word-of-mouth praise you may give our car. We are going to cooperate with you in every possible way to secure the maximum efficiency from it, but there are certain responsibilities that devolve upon you in the maintenance of this car, to insure its proper performance.

"It is necessary, for one thing, to lubricate it regularly according to the schedule we have given you, and to see that it is kept clean. In our instruction book you will find your attention called to other minor considerations that must be given to it, none of them difficult to put into practice, but each one of which is essential to your car's well-being. If you fail in the performance of these duties, you have access to a repairshop maintained by our organization for your convenience, where, of course, you will pay for the cost of your inattention."

Aside from service, there are other factors in the automobile business which serve to complicate it and cloud the issues involved, unless a very careful analysis is made.

In the first place, fully seventy-five per cent of all transactions involve the acceptance of a used automobile as part payment on the new car. This, in itself, makes of every deal a transaction of both buying and selling. The buyer is desirous of purchasing a new car, but first of all he is concerned over the sale of his old car. Right here is created one of the greatest hazards of the retail automobile business, for it so happens that the buyer is often a better salesman than the automobile salesman himself, and accordingly effects the



sale of his old car at a price which loses money for the automobile house.

The buyer's psychology in many of these trades is indeed hard to fathom. He is so obsessed with the value of his used car that many times he will make an expenditure of a larger amount of cash in the purchase of a more costly car, merely because he is given a greater allowance for the car he is trading in. He may even not buy the car of his choice, costing less than the car he finally selects, simply because the allowance on his old car, which suddenly becomes the pride of his heart, is not sufficiently large. Despite the fact that he may be a shrewd business man, he is rather tickled when he makes a deal that brings a loss to the company from which he purchases.

This used car business has been the rock on which many an automobile concern has floundered. The dealer, in his anxiety to secure new business, ties up his profits in a stock of used cars sold to him at inflated prices, and sooner or later succumbs to inexorable economic laws. Outside of the piano, talking machine and typewriter businesses, there are few retail enterprises in which used merchandise is taken as part payment, and when the tremendous scope of the automobile business is considered, the degree of hazard can readily be realized. Only the employment of expert appraisers, who buy used cars at their market value regardless of pressure from the sales department, and the exercise of a high degree of courage on the part of the management, can avert a business tragedy.

#### GROWTH OF AUTOMOBILE BUSINESS HAS BEEN RAPID—SECOND LARGEST INDUSTRY

COMPARED with many other lines of merchandising, the large automobile dealer's discount is strikingly low, and the salesman's commission very small. The buyer, moreover, in striving to drive a good bargain in the trade-in of his used car, tries to diminish that profit still further, and then, to cap the climax, unreasonably expects gratuitous service after his purchase. It is an unalterable fact, in the automobile as in any other business, that a dollar will buy just so much and no more, and there is no way that, in the long run, will produce the automobile buyer an unjustified return.

The wonderful growth and development of the automobile

business, and the unlimited possibilities that lie in its future, are directly traceable to the desire of practically every man, woman and child in the country to own a car. Except in periods of financial depression, including the one we are now passing through, this desire of the public for automobiles has made it impossible to attain a rate of production that equaled the demand. Such a favorable condition of an assured and waiting market has naturally had its effect on automobile merchandising. It was bound to follow, as a result of the rapid growth of so young a business to the second largest industry in the country, that it would require time and experience to ripen the retail automobile merchant's judgment and give him the proper perspective of the service his own business should render the public.

#### THE AUTOMOBILE'S HIGH PLACE IN THE HISTORY OF TRANSPORTATION

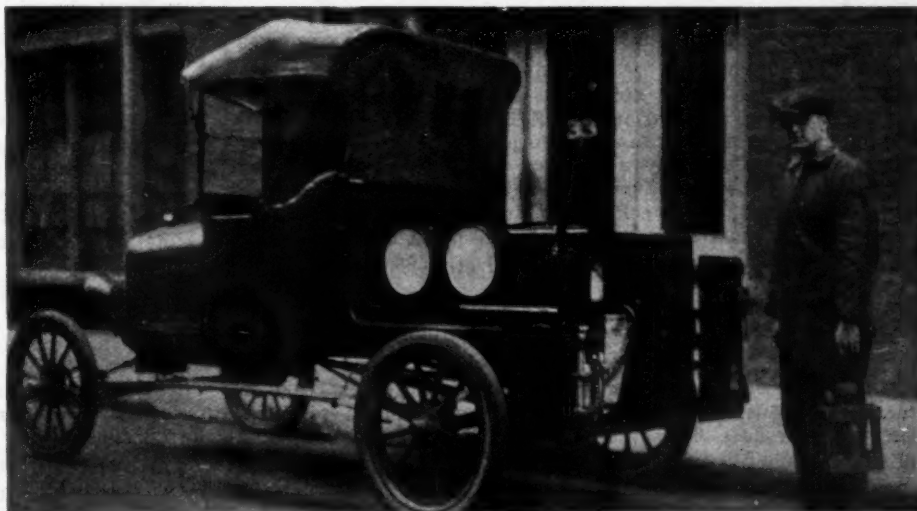
THE automobile distributor, with a keen sense of his responsibilities, has labored to evolve systems and organizations that reduce to a minimum the possibility of the owner being deprived of the use of his car, except when unreasonable abuse places it beyond his control. It remains for the owner, therefore, to become inspired with a new respect for the means of transportation that so faithfully serves his daily needs. It is for him to become imbued with the idea that fully fifty per cent of the responsibility for the operation of his car rests upon him, and that until he recognizes this responsibility and accepts the very casual duties it places upon him, no amount of manufacturing genius or skill in servicing will obliterate his troubles.

In the history of the world, the greatest element in its advancement has been transportation; and the advent of the automobile, placing as it does at the control of the individual an unparalleled means of quick, convenient travel, constitutes one of the greatest strides in the history of mankind. The growth of the automobile business is the proof of its utility, and with the coming of a fuller appreciation of its virtues and a wider understanding of its attendant problems by the user, the future of the automobile will be limited only by that far-away period when men deny their natural instincts, seek holes in the ground and again become hermits.

### *Inspection and Adjustment Service Sold on Monthly Flat-Rate Charge Per Call*

THE R. H. Cowles Auto Maintenance & Service Co. of San Francisco, has equipped four Ford cars for the purpose of rendering service on an unusual basis to motor car owners. This service consists of keeping customers' cars in perfect running order at all times. The service cars visit the automobiles once or twice a month, or oftener if necessary, and the operator spends an hour in making adjustments, oiling, testing and filling batteries or other service. Each operator services eight automobiles daily. A charge of \$2 is made for the first service in any month, and \$1 each for all other service calls during that month.

The Ford is equipped with two 15-gallon tanks, one for kerosene and the other for carrying cylinder oil. On the back of the Ford is a cabinet which carries hard cut grease for filling universals and grease cups, a bucket of 600W, with a pump for delivering the grease, a drain bucket for draining and flushing crankcases and a battery testing outfit and compartment for waste. On the inside of the cabinet-doors are brackets for oil cans and grease cups. The top of the cabinet is divided into



sections for carrying all kinds of tools and wrenches. These sections are covered with a top that is also a creeper, which the operator uses when working under cars.

The owner of an Indiana repairshop whose first name is George has erected

a tall post in front of his place near the curbing with a hand pointing at his shop and with these words on the hand, "Let George Do It." The sign has attracted much attention and is held by the owner to be responsible for quite a goodly percentage of the business which comes to his shop.

# Why Be a Pessimist When the Facts Are Optimistic?

*IN Looking Ahead for the Winter, Have You Given Proper Consideration to Basic Facts or Are You Merely a Victim of Gossip of Hard Times?*

By James Dalton

*News Editor, Class Journal Co.*

WITH the coming of November there have appeared within the automotive industry evidences of an attitude of uncertainty and doubt as to what the next few months may bring in the way of business. MOTOR AGE has predicted frequently that trade will be better the coming winter than is generally expected. Nothing has appeared on the horizon to change this belief.

The fundamentals of general business are steadily improving. While there undoubtedly will be a considerable amount of unemployment until spring, it is not likely it will increase to a greater extent than has been the case in more normal winters. The outlook for the building trades, for example, is more hopeful than it has been in several years because a greater volume of building operations is under way throughout the country than at any time since the war.

It is becoming apparent that a considerable part of the unemployment for the next two or three months will be voluntary. Further reductions in wages are being fought vigorously in various trades and in many cases workers probably will strike rather than accept them. Their contention is that the decline in the cost of living has not been commensurate with the wage reductions proposed. The labor situation in the automotive industry is highly gratifying and the relations between employer and employee seem to be more satisfactory than in almost any other line. In some industries, however, employers are showing a disposition to take advantage of the present opportunity to force wages lower than their employees are willing to accept.

The industrial survey conducted by the United States Employment Service showed only a slight slowing up in automotive plants for October as compared with September. The decrease in employment was 2.8 per cent, or an actual falling off of 4883 in the establishments which reported. There was an increase of 1.01 per cent in employment by the 1428 companies in all industries reporting. These firms usually employ more than 500 workers each, or a total of 1,600,000.

## INDUSTRIAL EMPLOYMENT TREND UPWARD

The report shows that the industrial situation, as represented by employment conditions, showed a steady improvement in October. An outstanding feature was the marked increase in the basic industries such as iron and steel, metal products and the railroads. These gains more than offset the decrease in the automotive industry, which is a seasonal condition, and in the miscellaneous group, caused largely by the slackness in the shipyards. Reports from 231 of the principal industrial centers indicated that public improvements were absorbing some of the common labor released from agriculture, canneries and other seasonal activities.

Total employment in Detroit fell off only 192 last week, as compared with a decrease of 3900 the previous week. The monthly trade letter of the National Bank of Commerce of Detroit shows that 14.10 per cent of all lines of trade in that city were normal in October, as compared with 11.25 per cent

in September, making 85.90 per cent below normal as compared with 88.75 per cent the month before. A forecast of future business conditions made by the bank shows 42.31 per cent improvement in October, as compared with 43.75 per cent in September, and 44.87 per cent stationary as compared with 47.50 per cent the previous month. Bank clearings in Detroit for September, 1921, were \$406,698,000, as compared with \$416,711,000 in 1919 and \$561,592,000 in 1920.

The easing of credit conditions is reflected in reductions of rediscount rates made by all Federal Reserve banks. This has been reflected in corresponding reductions by member banks. The rate of the New York Federal Reserve bank now is 4½ per cent, which is the lowest on commercial discount since February, 1918.

A survey of general business and financial conditions issued in Washington by the Federal Reserve Board contains the statement that "some distinctly encouraging elements in the general business situation are to be noted. The outlook in the textile industries is among these. \* \* \* Consumption of raw materials continues at a high figure and the total used in September was in excess of that reported for September, 1920.

## CONDITIONS IMPROVE IN IRON, STEEL AND LUMBER

"In iron and steel an increase in both production and in unfilled orders has taken place, which although limited in amount, is regarded as of first-rate importance, marking the turn from the low point.

"Better conditions are also reported in the lumber industry. \* \* \* The activity in building has been particularly noteworthy because of its continuance beyond the time when the seasonal reaction would ordinarily occur.

"The better conditions in the agricultural districts combined with improved buying demand and the larger activities in manufacturing have naturally been reflected in increased activity in the wholesale trade.

"Retail trade has been well maintained in most parts of the country."

R. G. Dunn & Co., in its weekly review of business, issued Saturday, said:

"Response to the constructive forces in the economic situation does not come quickly, but evidences of revival multiply. The recovery would be more rapid if fewer restraints were present, yet the gain is fairly steady and there is promise of its continuance. \* \* \* While all statistical barometers do not reveal the improvement in business, records of production in several basic industries are distinctly better. \* \* \* The trend of buying everywhere is toward the staple and lower cost merchandise, and the practically general resistance to price advances is added proof of the growing trend of economy."

Bradstreet's comment on the general situation said:

"Trade reports indicate rather more irregularity and some shifting of activities as November opens. For this, varying weather conditions, the averting of the railroad strike, the apparent passing of the peak of fall distribution at big primary markets, the continuance of unsatisfactory prices for farm



products in the West and a combination of lower prices and warm weather in the South, are held variously responsible. The feeling is general that October as a whole was a fairly good month in wholesale and jobbing trade, that manufacture and industry made some notable forward steps and that unemployment decreased, but that collections rather tended to sag and that old past due payments, especially in the South, were not liquidated as well as expected."

### GENERAL BUYING CONDITIONS BETTER

The John V. Farwell Co. of Chicago says in a weekly review of trade:

"The wholesale dry goods business is manifesting a much greater activity than during the corresponding week of last year, the number and volume of road orders showing a large increase.

"General buying conditions have also improved, it is reported. The larger retailers are making more complete commitments for spring in many lines. This is bringing about a much better and more normal percentage in a comparison of business volume with the number of orders received."

The monthly review of credit and business conditions issued by the New York Federal Reserve bank, and dated Nov. 1, states:

"The volume of new building undertaken in the country, as a whole, in September was larger than in any previous month this year, and in this district was larger than in any previous month for which there are reliable records. This activity continued at a high rate during October.

"The production of iron and steel and of textiles shows a continued increase.

"The volume of the country's railroad traffic, especially shipments of manufactured articles, was larger during September and in early October than in any previous period this year."

The decrease in the number of idle freight cars continues steadily week by week. The decline last week was attributed largely to increased shipments of coal.

Interesting evidence of the better feeling among manufacturers is reflected in the large orders for new machinery to replace worn equipment, which were placed by cotton manufacturers at the International Textile Exposition at Boston last week. It was reported that marked improvement in conditions has made necessary the speeding up of operations.

Probably the most significant indication of renewed confidence is the extraordinary strength of the bond market. Bonds of the United States and other governments have advanced rapidly in the past two weeks and their strength has been reflected in industrial bonds. The bond market is regarded as a barometer of industrial conditions.

The number of failures in October was 17 per cent greater than in September, but experience in past periods of depression has shown that the trend of business failures was steadily upward for months after business improvement began.

While there are no clouds on the business horizon which need give alarm to the automotive industry, it undoubtedly is true that the coming months will bring a period of exceedingly keen competition in all lines of the industry. Those companies which give best value for the month and greatest service will be the ones which will enjoy the most substantial business.

## Tire Dealers' Cooperative Advertising Preaches the Truth and Builds Confidence

### Of Interest to Car Owners About "NFC" Tires

"N F C" stamped or burned on a tire is the manufacturer's acknowledgement that the tire is "Not First Class."

#### How You May Recognize an "N F C" Tire

- 1—N F C burned on the side wall of the tire.
- 2—N F C burned on the bead of the tire.
- 3—N F C stamped on the inside of the tire.

The serial number is left on "N F C" tires, showing there is a factory guarantee on them, but because they are "N F C" (Not First Class) the factory guarantee is less than on a "first."

Any of the dealers listed below will be glad to tell you more about "N F C" tires.

"GET YOUR SERVICE WHERE YOU PURCHASE YOUR TIRES"

Tire Dealers Division of

### Houston Auto Trades Association

|   |  |  |
|---|--|--|
| Auto Owners Supply Co.<br>Hood                      | Hawkins & Schultz<br>Supply Co.<br>Fisk        | Modern Tire & Repair Co.<br>Federal                    |
| Sterling D. Anderson<br>Michelin                    | Pendarvis & Moore<br>General                   |  |
| Batterson & Crawford<br>Diamond and U. S.           | Hutchings Tire & Repair<br>Company<br>Oldfield | S. O. S. Tire Service<br>Firestone                     |
| Bryant Auto Supply Co.<br>Miller and Goodyear       | Ideal Tire & Repair Co.<br>Brunswick           | Southern Tire & Repair<br>Company<br>Kelly-Springfield |
| Curtis-Bryant Tire Co.<br>Savage, Portage and India | Long Tire & Repair Co.<br>Swineheart           | A. B. Stryker & Co.<br>Quaker                          |
| Geo. L. Glass & Sons<br>Goodyear, U. S. and Miller  | Lee Tire Service Co.<br>Lee                    | The Tire Shop<br>Expert Vulcanizing                    |
| Gulf Coast Tire & Repair<br>Company<br>Norwalk      |  |  |

Look for the Next Advertisement of This Series in The Houston Post October 16  
WE'RE FOR GOOD ROADS—TALK 'EM!

### OF INTEREST TO CAR OWNERS

**How You Can Distinguish a "Second" Tire From a "First"**  
Every known tire manufacturer places on each tire a factory serial number. This number is stamped into the side wall of the tire and is always plain and distinct. The size of the figures in the serial number measures about  $\frac{1}{4}$  inch in height. The numbers are generally from 4 to 12 figures in length. Every tire carrying a serial number of this description which is not defaced in any way is guaranteed by the manufacturer who builds it.

#### HOW "SECONDS" ARE MARKED

"SECONDS" are marked by the manufacturer by one of five distinct methods:

- 1—By branding the word "SECOND" through the serial number with a hot iron.
- 2—By branding word "2ND" through the serial number with a hot iron.
- 3—By branding the word "SECOND" on the bead of the tire with a hot iron.
- 4—By buffing the serial number off the tire.
- 5—By buffing the serial number and manufacturer's name off the side wall of the tire. The defacing must be done by the manufacturers or by their definite orders.

ANY of the following tire dealers will be glad to explain more in detail the facts as stated above.

"GET YOUR SERVICE WHERE YOU PURCHASE YOUR TIRES"

Tire Dealers Division of

### Houston Auto Trades Association

|   |  |  |
|---|--|--|
| Auto Owners Supply Co.<br>Hood                      | Hawkins & Schultz<br>Supply Co.<br>Fisk        | Modern Tire & Repair Co.<br>Federal                    |
| Sterling D. Anderson<br>Michelin                    | Pendarvis & Moore<br>General                   |  |
| Batterson & Crawford<br>Diamond and U. S.           | Hutchings Tire & Repair<br>Company<br>Oldfield | S. O. S. Tire Service<br>Firestone                     |
| Bryant Auto Supply Co.<br>Miller and Goodyear       | Ideal Tire & Repair Co.<br>Brunswick           | Southern Tire & Repair<br>Company<br>Kelly-Springfield |
| Curtis-Bryant Tire Co.<br>Savage, Portage and India | Long Tire & Repair Co.<br>Swineheart           | A. B. Stryker & Co.<br>Quaker                          |
| Geo. L. Glass & Sons<br>Goodyear, U. S. and Miller  | Lee Tire Service Co.<br>Lee                    | The Tire Shop<br>Expert Vulcanizing                    |
| Gulf Coast Tire & Repair<br>Company<br>Norwalk      |  |  |

Look for the Next Advertisement of This Series in The Houston Post October 12  
WE'RE FOR GOOD ROADS—TALK 'EM!

WORKING in the knowledge that only honest business methods will build a permanent and profitable trade, the tire dealer's division of the Houston Auto Trades Assn. has inaugurated a cooperative advertising campaign to instruct the car owner how to get the most for his tire money and to convince him of the benefits derived from dealing with sound, legitimate tire concerns. The advertisements reproduced throw light on the subject of blemished tires. The lines "Get Your Service Where You Purchase Your Tires" and "We're for Good Roads—Talk 'Em" appears in all the ads

*After Reading the Article in the Nov. 3 Number You Are Now Ready for*

## First Steps in Blacksmithing

*There Is a Man-Sized Potential Profit in This Branch of the Automotive Maintenance Business. This Series Will Give Practical Instruction in Blacksmithing*

By R. C. Jones

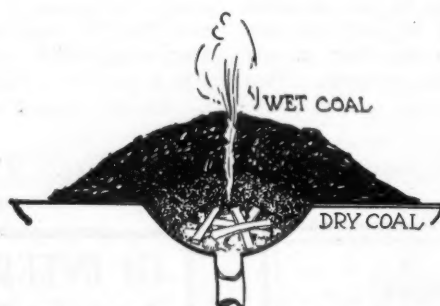
**I**T IS presumed that you are equipped as described in the previous article, and are now ready to commence blacksmithing.

The first thing to tackle is your fire. Get a handful of paper or shavings, and a half dozen sticks of pine wood less than a foot long, lay them over the tuyere, and pile a ring of dry coal around them. Light up, and blow gently as you heap the coal on with the shovel held in the right hand. When your coal is glowing, heap a ring of wet coal around it, and pile some more on top. Punch a hole in the top of the heap, directly over the tuyere. Blow hard.

In a minute or less you will have a good fire. Blow gently for about five minutes, while the blue flames break through the sides of the heap. They are a sign that the coal beneath is turning to coke.

Since it is coke, and not coal, that gives the best heat, you must keep up your supply of coke as you work. This is done by putting wet coal on the fire occasionally, and keeping the outer surface of the fire wet. Keep your fire small by quenching the outer edge of it occasionally. Keep it concentrated over the tuyere as much as possible, for that is the only place you'll get action. A big fire just heats up the metal on both sides of the working point, makes it unmanageable, and makes you sweat.

Occasionally pull the clinkers and ashes out of the center of the fire, and each time you put your iron in, knock some of the preheated coke into the center. Have a metal bucket handy to receive the ashes, and wet them down to keep dust out of your eyes. Knocking coke into the center of the fire keeps the fire deep enough over the tuyere to heat thoroughly the air coming up; thus you have a spot of fierce white in-



Later, when you have plenty of coke, the wood kindling may be omitted. Paper will do.

candescence that heats the iron quickly with little blowing.

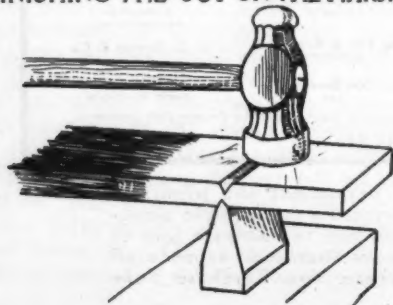
### NOW TO WORK

You need a poker, or "slice." To make it, a thirty-inch length of three-eighths square stock is needed. Measure off the length, and make a punch or chisel mark on two opposite faces. Put the marks in the center of the fire, cover the rod, and blow. Don't work the bar too deep into the fire. After three or four minutes, slide it out lengthwise. You should find it a light orange color. Set the hardie in the hole, place the chisel mark on it, and give it a light blow or two, just enough to cut half-way through. Turn it over and cut from the other side until a thin web of metal holds the two pieces together. Then place the cuts at the edge of the anvil, and, striking with the edge of the hammer on the edge of the anvil, shear the web, letting the end drop gently to the floor. Don't try to cut clear through on the hardie—that ruins the hardie's edge, and sends a piece of hot metal flying through the air to hurt someone.

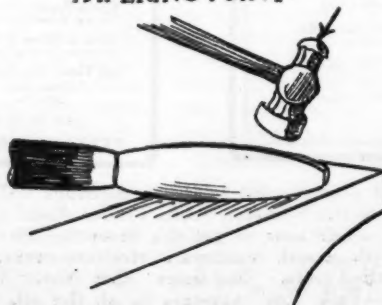
Now mark the stock three inches from the end and get a heat—pale orange—about four inches long, with the mark in the center. Place the mark on the edge of the anvil, facing up, and strike half way between mark and end with the full face of the hammer. Follow the iron around as it bends, striking alternately against the face of the anvil and the side, until the iron lies close to the surfaces. You will notice that the bend is not sharp, but still somewhat rounded. Heat it up again to a bright orange. Dip the short end in the water, so that for only about an inch from the bend it remains hot.

Now place the tip of the short end on the anvil and strike with the center-line of the hammerhead a continuance of the center-line of the short end of the "L." Do the same in the

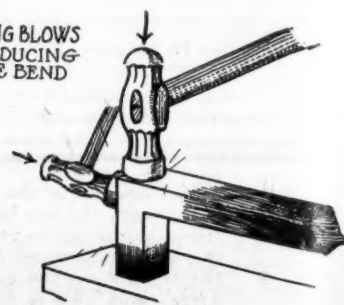
FINISHING THE CUT ON THE HARDIE



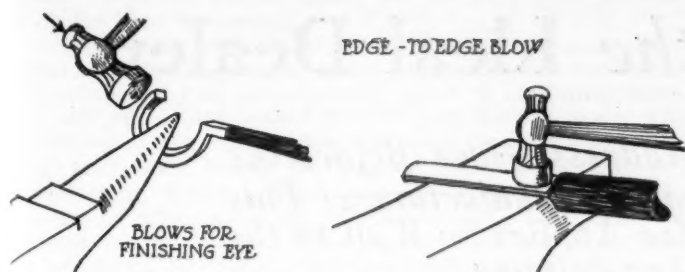
TAPERING POINT



FINISHING BLOWS FOR PRODUCING SQUARE BEND







direction of the longer end, alternating the blows. An occasional blow on the side of the bend will keep it from canting. Work carefully, placing each blow exactly, for too much hammering will make the bend smaller than the rest of the bar, resulting in an unsightly job.

Heat up again and place the middle of the short end on the tip of the anvil horn with the long end up. Strike on the tip of the short end, bending it down around the horn. Drop the long end as the short one bends, to keep the tip of the short end horizontal. When quite a hook is formed, hook it onto the horn from beneath and continue turning the hook until a complete ring is formed. Heat up again, and strike at the irregularities until a perfect circle is formed. When working on the horn, remember that all blows must fall off the center line, or the result will be merely "drawing" the iron instead of bending.

Cool off the ring. Leave it in the water a full minute, and see that it is submerged beyond the fire marks as much as possible. Iron may be black as tar, yet hot enough to take skin and flesh off when touched.

If you have done your work well, you can just slip a piece of one-inch round stock into the eye without seeing much daylight anywhere between.

Now, get a monkey wrench, set the jaws just far enough apart to slip the stock between them, and lay it beside a vise with its jaws set the same. Heat your rod for six inches below the eye. Cool the eye quickly, clamp it in the vise, set the wrench up tight on it at the six-inch mark, and twist it through one complete revolution. Keep it straight, as you can't hammer it straight after twisting, without marring the spiral edges. Cool the twist thoroughly.

#### STRIKE ACCURATELY

Now get a four-inch heat on the other end. Place one face of the iron on the anvil with the four-inch mark at the edge. Strike with the face of the hammer parallel to the face of the anvil, and with the edge next you directly in line with the edge of the anvil. That will throw up a shoulder on each side, against the edge of the hammer and the edge of the anvil. Turn the work every few blows, so the shoulders will be of equal sharpness.

The anvil makes a better shoulder than the hammer. These edge-to-edge blows must be delivered very accurately, or the shoulders will be ragged and ugly. When you have formed a clean-cut shoulder on each side, strike nearer the end until the same thickness is reached as just below the shoulders. Keep the drawn part the same width all along by occasional blows on the edges.

Carry this on until the drawn part is a little over three-sixteenths of an inch thick. It should spread symmetrically and quickly to about five-eighths, and keep that width clear to the end. Now taper it to an oval point, beginning halfway from shoulder to edge. Do this by holding it lengthwise of the anvil, at about a 10-degree angle to the face. Start hammering at the end, and work edge and side alternately to keep the same thickness. To round off the end, lay the stock flat on the anvil with the point projecting beyond the edge, hold it down hard, and tap lightly lengthwise, each blow falling from a different angle, like the sticks of a fan.

#### FINISHING OPERATIONS

Now put the flatter handy to the heel of the anvil, and have your partner stand by with the sledge. Lay the work flat on the anvil, holding it in the left hand, while you hold the flatter on it with the right. Strike very gently with the

sledge (a ten-inch fall is enough for very light work like this). Move the work back and forth under the flatter. If you move the flatter, the striker is apt to miss it, spoiling your work. Very little flattening will produce a nice smooth surface on the work. See that the flatter locations overlap about half the face of the flatter.

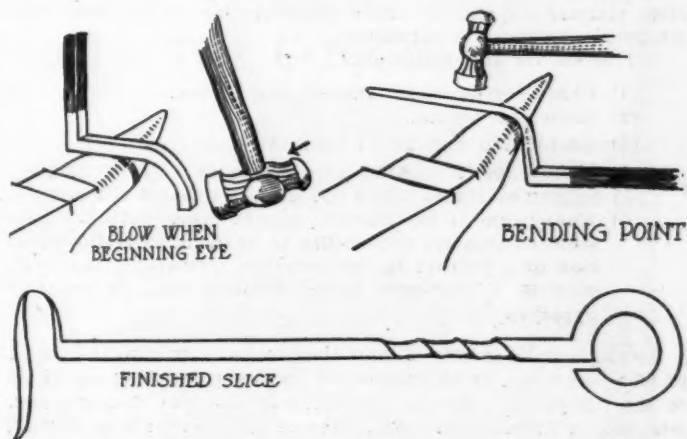
Next make another sharp, square bend at the shoulder, using the same procedure you used for the square bend preliminary to making the eye. Then, one and one-half inches from the bend, make a two-inch semi-circular bend, keeping the point in line with the shaft of the slice-bar. Make this bend over the horn of the anvil just as you made the eye.

You now have a slice that will hook a clinker out of the fire without any trouble, that can be used as a pick to break small lumps of coal or coke, and that will tamp fuel under a piece of heating iron without letting too much heat escape or moving the work out of the fire. Your hands won't slip on the twisted grip, and you can hang it out of the way, yet handy, by the eye.

#### FUNDAMENTAL OPERATIONS LEARNED

This job has taken in four of the fundamental operations of blacksmithing: square bending, round bending, drawing and flattening, as well as one of the frills, twisting a square bar to ornament it.

Don't burn your iron. You can tell when this is happening by a shower of sparks coming from the fire, like a child's "electric sparkler" on the Fourth of July. This means that



the surface of the iron has melted. When you take a piece of burnt iron from the fire, you will find the surface rough and nubby, very hard to smooth out and finish. This heat is used only in welding, which will be described in a later article. Remember that a light orange, almost white, is the easiest working heat for iron, and a light cherry red for steel. There's no use and much labor in pounding cold or cool metal. Be careful of your heat, and you'll save a lot of labor, as well as turn out better work.

The making of a pair of tongs will be described in a future article, and different forms of jaws shown, with instructions for making them.

### Don't Worry When Car Skids

If you have learned first aid or if any of the members of your party have, you can snap your fingers in the face of fate and laugh.

The American Red Cross will teach you how. Apply to the secretary of the nearest chapter and learn just what you must do in order to organize a class.

The work of the Red Cross in first aid is too well known to need explaining. More than half a million railroad employees alone have taken the Red Cross course, and many large industrial and public service corporations, such as the Bell Telephone Co., have made it part of the training of their employees. Last year 5100 classes were held, 20,172 persons certificated, and 104,495 students enrolled.

Nov. 11-24 is the time set for the fifth annual roll call. The membership fee is \$1.

# Constituents of the Ideal Dealer

*HERE Is Presented an Address Given Before the National Farm Equipment Manufacturers; This Description of an Ideal Dealer Applies So Well to the Automotive Field That We Are Printing It*

By Grant Wright

Secretary, Eastern Federation of Farm Machinery Dealers' Associations

OUR federation embraces dealer associations now active in the field whose membership extends from Maine to South Carolina on the Atlantic seaboard, and in spite of some gentlemen at Washington thinking differently, our efforts have been to build on a sound foundation that will permit proper service to the farmer, and proper cooperation with the manufacturer.

We have set up ideals, for we have tried through association work to show the dealer his true position in his community and the way to serve better and fit himself in every possible manner for the favorable consideration of the men with whom his business is conducted.

Our ideals for the dealer are:

- (1) Character-business training and ability.
- (2) Sufficient capital.
- (3) An attractive place of business.
- (4) Knowledge of cost-expense, as a basis for price making.
- (5) Selling on terms which enable him to meet obligations.
- (6) Knowledge of his market, acquaintance with his possible customers, and ability to perform fully the function of a partner in the carrying forward of the business on a profitable basis, while saving all needless expenses.

I want to take briefly of your time to go more into the detail of what we mean by character and business training, for many of the ills of the past can be traced to the fact that the men who sold implements at retail were at the best traders, willing to stoop to any practice that would bring the order. The need is for real merchants, men who have a standing in the community. In the old order of things it was thought that when a man got too old or too lazy to farm, he would make a good dealer. If he was a bum preacher, blacksmith or what-not, he was timber for the dealer field. The new order requires training and ability.

## DEALER MUST UNDERSTAND SELLING TERMS

Sufficient capital is of great importance, and we are urging this important point, and with it the necessity of making banking arrangements at home to the end that the money of the local bank will properly be employed in the development of agriculture at home instead of the kind that is done in Wall street.

Implement dealers to run economically must have storage houses located on the railroad, but the most essential retail business of any community should be housed in an attractive store on the main street where set-up machines can be shown, which will become the center of agricultural activity for that section. We believe in more buying in the store and less over back of the barn.

Knowledge of costs and the expenses for conducting business are woefully lacking in all fields of retail endeavor. The price to the farmer cannot be just and fair until the merchant knows costs, and our educational features have paid special attention to this feature. It does not mean, as the Federal Trade Commission seemed to think, that uniform and agreed prices will result, but it does mean that when a merchant knows his costs he will not be a price cutter to sell, but will sell his goods on quality argument and refuse to break his

price to meet unwise competition. The full value of this is appreciated when it is realized that the successful merchant pays his bills and his volume grows from year to year, while the hit-or-miss kind generally get you involved into court actions to get your just due money.

Proper selling terms must be understood by the dealer and these terms must be predicated on the terms that you gentlemen give to the dealer. We are teaching dealers that no implement should be sold unless the pay day is set, which is reduced to writing that forms a common understanding and which the bank can use for discounting. We are trying to cure one great ill of the implement industry—too free credit.

These are but the things that you gentlemen all know should control the dealer in his business life, but we are going much further when we attempt to make the dealer a man who knows his market better than your salesman, for in this work we know that the ultimate result will be a great saving in your selling expenses. Manufacturers may know to the fraction of a cent what it costs them to produce implements, but I question if any manufacturer can figure the probable expense of selling implements in any one season, for in this item of expense comes that of the salesman, the printed catalog, advertising, and many other items that go toward sales and collection effort.

## IDEAL DEALER A PARTNER OF MANUFACTURER

This ideal dealer is being educated to the fact that his standing with the farmer depends on his dealings with the farmer, and that it is just as much his business to sell what he buys as to buy correctly. He, therefore, will only require the selling help of your men when perforce a new implement is introduced, and all sales will be made by him without the help of the factory man. That this will effect a saving, no one will deny, and the only excuse for the continuance of the old plan of factory aid in selling is that the dealer will not perform this important service to his business.

Few manufacturers and dealers realize the waste in the printed literature of the industry. Our industry is noted for the best and finest printed matter of any, and all this expense is entered into by you gentlemen in the hope that it will help sales. We are teaching the ideal dealer that the literature supplied by the manufacturer is of the greatest value, and that every piece sent to him ought to be carefully placed in the hand of the possible buyer; and, aiding in this, we are constantly alert to see that racks for holding this literature are kept in order at all times of the day, so that sales will be increased and the full purpose of the expense on your part be fulfilled.

This ideal dealer likes to be called a partner with you in the enterprise of selling implements with service and profit, and I know of no better plan whereby the dealer can cooperate with you as a partner than in the saving to you of advertising expense. The farmer of America is a reader, and ample evidence that advertising to him pays is at hand; but when we wish the one safe and sure plan of getting the story to this farmer in a way that will connect him directly with the dealer's store and the dealer's business, we must consider the local paper in the community, for it is one safe bet that every



farmer reads two printed pages, one the Holy Bible and the other the local newspaper.

Our theory of this is that the expense of the local newspaper advertising should be paid by the dealer and not by the manufacturer. You gentlemen will all O. K. that proposition, but your advertising consul will tell you that the dealer will do nothing of the sort and that you must spend this money to keep your name before the farmer. He is both right and wrong, right when the dealer of the past has been concerned and wrong when the dealer of the future is considered, for remember, I am holding up to you the ideal dealer, the kind we are trying to create, and I may say, with some success.

I fear to go on talking about this ideal dealer, the man of our dreams, but we all realize the truth about the need, and I am pleading for your cooperation and that of your sales organization to make possible many of our dreams and to back up many of our efforts along the line of making real the ideal.

I could tell you a lot of things that would have to be changed to satisfy this ideal dealer. He wants to buy from a reliable house making a reliable and standard line of goods, and he does not want his store to be the dumping ground of a lot of assorted junk. To succeed, he must specialize, and this leads him to careful selection of lines.

He does not see his way clear to buying on the spot cash plan, but is willing to aid in every way possible by adopting the acceptance plan.

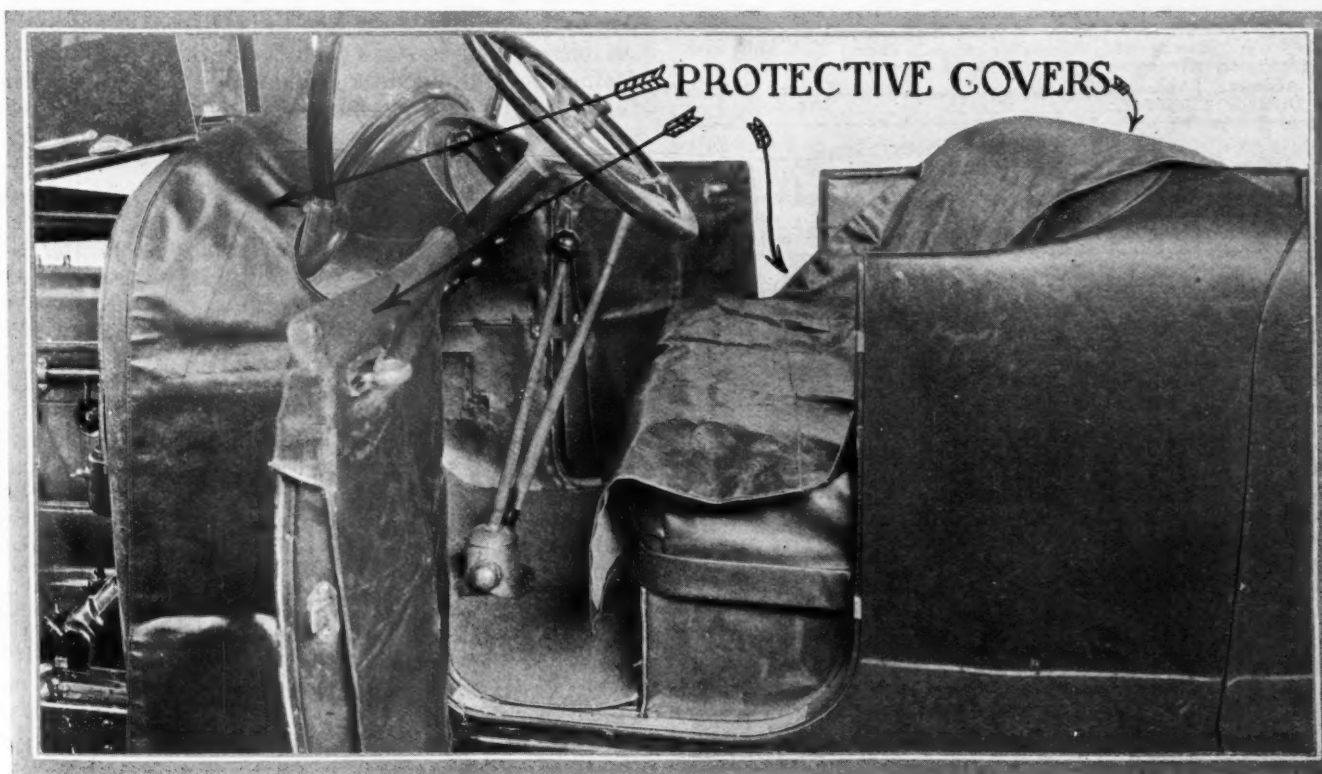
But why go further; we all know the things that should be done, and I suggest doing them. The dealer will cooperate as you show him you are willing, and our associations are working toward the goal of perfect understanding between the seller and the buyer, toward the goal of correcting the mistakes which have made the retail implement business unprofitable and undesirable.

Mr. Wright did not make this talk exactly as he wrote it for publication, and one interesting feature was contained in his remarks that is not in the above text. It was this, to quote the speaker informally:

Some years ago the automotive papers began a movement to have the dealers in automotive vehicles handle implements, especially tractors. The representatives of the automotive press took to the tractor manufacturers pictures of clean, bright automotive salesrooms and asked the manufacturer whether he thought his tractors could be sold better from establishments such as pictured or from the implement salesroom that he knew so well.

"We took the hint," said Wright, "and opened a campaign to clean up the implement salesrooms. We have succeeded."

The speaker might have added, however, that a great many automotive dealers have done very well with tractors, regardless of the cleaning up by the old-time implement dealer.



### Protecting the Car in the Service Station Essential

**W**HEN a new car is delivered to a customer the service station makes sure it is carefully cleaned and polished from radiator to tail-light. The customer must not get a dirty car. "John, get a little waste and clean those spots off the lamps," we hear the manager say to a helper. "The car is going to be delivered to the new owner today and must be right."

It is a strange thing, but when the new owner brings that car into the service station a week from the time of delivery it is handled in about the same manner as a railroad section gang handles its hand-car.

Go into the average service station and look at the cars. See how many of them are protected from the ravages of oil, water, grease and mechanics.

How often has a car owner come into the service station

to get his car, only to find a mess of grease on a fender, his steering wheel rim dulled with finger marks and a nasty scratch on the door from a carelessly handled tool. We seem to forget that automobiles are still the same high priced pieces of machinery when they come into the service station as they were when sold to the customer.

The illustration shows how one service station protects its customers' cars while they are being worked upon in the service station. These covers are made preferably from some sort of water-proof material, so they can be cleaned. Not only do these covers protect the highly finished surfaces and upholstery, but they make a good impression upon the customer. He has paid a lot of money for this wonderful piece of machinery and likes to see it respected.

# MOTOR AGE

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No. 20

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Member of the Audit Bureau of Circulations.

## A Thought of the Shop

WE'VE heard a lot about social environment and the part it plays in moulding the human character. Environment of the right sort seeks to make us better men and women. This applies mostly to our moral characteristics, but its principles are applicable to the automotive industry.

Environment has a direct application to the service stations and repairshops of today. It is productive of either good or bad. The proper kind will show itself in numerous ways. The knowledge of its existence is not enough to derive any of its benefits. But the application of its principles will be a big step towards directly improving the quality of service rendered owners, the caliber of the men in the particular organization and the appearance of the yearly balance sheet. Let us consider those divisions of the service station that are most acutely affected by environment.

The office and salesroom usually show that some thought has been given to the things that go to make for attractiveness, sales interest, comfort and cleanliness. The members of the organization on duty at this end of the building are invariably supplied with advantages of proper lighting effects, attractive display windows and cheerful furnishings, all of which tend to produce a mental attitude which is expressed in their efforts to do more and better work.

Unfortunately, though, the planning of the mechanical department oftentimes shows an entire lack of thought. The proprietor answers by saying that the mechanical department at best is conducted at a loss. Nevertheless, the ultimate success of any sales and service organization depends very largely on the reputation of its mechanical service department, for here is born that form of mouth-to-mouth publicity which is distributed by the owners and which either ruins or clinches the sale of a new car to his friend, the salesman's prospect.

It is in the mechanical service department that the human element needs the beneficial effects of proper environment, because we need, and need badly, more and better mechanical talent. The car owner derives his opinions of the quality and efficiency of the firm from the impressions he receives when he brings his car into the shop for mechanical attention. It is evident then that the proprietor should try to inculcate the same attitude here that he has sought to establish in his sales department.

Maintenance work on automobiles requires both mental and physical skill. The service foreman is a man who possesses both mechanical and executive ability. He often has the disadvantage of working for a hard-to-convince proprietor. But to retain the good men he has in his shop, and to develop others to a higher stage of efficiency, he needs the cooperation of his superior. He should be given a fair show by the installation of labor-saving equipment, clean and well-lighted work-rooms and facilities for the comfort of his men.

Where there are cold and greasy and rubbish-laden floors, there are ambitionless, greasy and careless mechanics. Washroom facilities should be provided, as well as a laundry service; for no self-respecting mechanic wants to wear his overalls until they glisten with grease and will stand by themselves. The resourceful and wideawake workmen will keep up with current practice by reading trade periodicals pertaining to their particular line if these are available. If an effort is made to make them contented, the workers will reflect the same effort to the owners with whom they come in contact. These things mould the character of an institution and supply the atmosphere that moulds the opinion of the public in general and their customers in particular.

Selling a car is quite a thing in itself, but it is not all, for as long as there are mechanisms there must be maintenance, and to provide intelligently efficient maintenance is to build for permanence.

The mechanic must be considered. He must be taught his responsibility in the selling of service and to bring this about he must be placed in the proper environment.

Now that you have read this, and probably agree with it, step out and look at your shop.



## Hope for the Sales Tax

OUT of the wreck of the manufacturers' sales tax plan defeat in the Senate at Washington comes a ray of hope. From Senator Smoot of Utah, sponsor for this form of tax, and some other supporters of the bill, comes the word that they expect that this form of tax will yet be placed in the present revenue bill.

The bill, as passed by the Senate, has gone to the conference committee of the Senate and House and



it is not going to have smooth sailing there. The two legislative bodies are considerably at odds over the forms of tax and the result will be a compromise. Evidently the sponsors of the sales tax features hope for much out of this conference.

If the situation does develop so that the sales tax again becomes a question, it will be the duty of every person interested in the future sales of automotive vehicles and equipment, parts and what-not, to come strongly to the support of this tax measure. When a general sales tax is adopted, the products of the automotive industry will be relieved of the present sales tax, which it shares with a few other articles and which is in reality a stigma tax. It will be the duty of every voter who is interested in the sale of automotive articles to write to his Senators and Representatives demanding that this tax be supported.



### Business Methods in the Shop

**A**N ELECTRICAL engineer and efficiency advocate two months ago entered the automobile repair business—repairing exclusively. He says it's a dignified business and worthy of a business man's ability. We agree with him.

The average repair business, he says, is conducted so inefficiently, with small leaks costing hundreds of dollars a month, that the car owner must be charged exorbitant rates to give the repairshop an even break. Sometimes the repairman, because of these leaks, cannot break even, so he goes broke. Perhaps he again takes up his job of mechanic. Too bad—business methods would have saved him.

This efficient engineer, when he took over this going repair business, was driven to grief when he saw the leaks that were draining the profits. As high as six trouble lamps a day were being broken because of carelessness and improper lamp guards. They cost him 30 cents apiece.

No one had thought of taking advantage of the two per cent discount on bills. A tidy saving was being overlooked here.

Parts were being put in jobs and no record of them kept, so they were not charged. Another loss.

Books were not properly kept. Customers who already owed money were having work done and allowed to drive out with a murmur of "Charge it."

This engineer knows of the Illinois lien law, and he keeps sharp account of money owed him and wastes no time in notifying delinquent customers of the law's existence. Unlike the man whose friends avoid him because they owe him money, he finds he has not lost any customers because he demanded his money. Bad accounts have disappeared. He advocates licensing of mechanics—especially so, when he considers the knowledge of some of the men who apply to him for work, saying they are mechanics. A few questions prove they are not.

He says he can charge \$1.10 an hour for labor and make money, while other repairmen in the neighborhood charge \$1.50 and make a scant profit. Perhaps here is a contributing reason: he has two-priced, efficient mechanics and several \$20 a week helpers. To reset the bearings, the helpers do all the preliminary work such as draining the crankcase oil, removing the bottom and taking off the caps. Then the helper checks out, the mechanic checks in on the job, sets the caps just right and checks out. The helper again

checks in and replaces the lower half of the crankcase, fills it with oil and cleans the car for delivery. The high-priced man does the difficult work only.

This engineer intends to add a trim, paint and enameling department. The floors of the repairshop will be scrubbed so they show the white concrete.

MOTOR AGE will watch with interest the progress of this man and will keep its readers advised.



### More About Used Cars

**R**ECENTLY a Chicago distributor in telling of his troubles with used cars said that the dealers' worst enemy was his new car salesman. "Why, a man will drive up to the front of our place, jump out of an old bus, run in and ask a salesman, 'What will you give me for that car?' and nine times out of ten the salesman will take the hook, go out and look at the nameplate, the number, and make an offer for it."

This offer, bear in mind, is made before the salesman even inquires whether the owner of the car at the curb is a prospect for a new car or not.

This description may be exaggerated, but it in the main is true in a good many cases. And some dealers have not been quite as energetic in trying to change the method as they might have been. There are reports in circulation now of several large dealers in various parts of the country who have sold a good many cars during the past season and who are in serious trouble because of their stocks of used cars. It is not at all difficult to invest all of your car profits in used cars and then have them hang on when you need the money.

At the same time this Chicago distributor was making the remark quoted above, the president of a motor car manufacturing company was writing a sales letter to the salesmen of his dealers. One of his remarks was:

"If any salesman in our organization permits a man to start talk about the allowance on his old car before he has driven and ridden in our new model, I will say that that man does not possess ordinary brains."

Here is a statement of the trouble and a recommendation that will go a long way toward a cure. What are your salesmen doing? Now that dealers are to have the aid of the manufacturers on this much discussed problem, there should be an amazing recovery from the jumble, if each dealer will require each of his salesmen to help along the straight path.

One thing is very sure; the manufacturers cannot solve this problem without the help of the dealers and their salesmen, especially the latter, for they are the most numerous body of men concerned.



### The Railroad Strike

**T**HE railroad strike was called off. That was fortunate, as the country is ill prepared for such a struggle. Business needs encouragement, not such a handicap as a strike would have proven.

While we have firm relief as to the extent the motor truck would have proven itself an agent of relief, we are content that this opportunity of spectacular service did not develop. The truck is so firm economically, when properly managed, that it cannot fail to win its proper place in industry in the very near future. The truck is much too valuable to need to ride into prosperity through adversity of others.

# Sales Basis Controls Production

## Dealers Slow to Buy Cars to Meet Early Spring Sales

### Tight Bank Credits and Lack of Price Stabilization Assurance Given As Causes

NEW YORK, Nov. 15—Slackening of production, which had been expected in the passenger car field this month, already has become apparent, especially in the medium priced lines. The falling off includes such companies as Ford, Dodge, Buick and Studebaker. While the Ford November schedule calls for 85,000 cars, it is flexible and production will be continued on the basis of sales.

While these companies, which have been running at top speed for many weeks, are slowing up, other manufacturers who have not done so well are now benefiting from new models and new prices. Maxwell is conspicuous in this list and its new models have brought many congratulatory comments. Advance reports of the new Chalmers line indicate that it will be on a par with its companion car and that the two together will do much to rehabilitate the Maxwell-Chalmers combination.

Numerous other companies have brought out new models embodying many

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## Keystone State Organizes Its Dealers' Association

Harrisburg, Pa., Nov. 14—The Pennsylvania Automotive Assn. was organized here Nov. 10-11 with 200 members. It is affiliated with the National Automobile Dealers' Assn., and will include in its membership car and truck distributors and dealers, jobbers, automotive equipment dealers, repairmen and various others in the automotive trades who will be associate members.

The association was formed with the twofold purpose of employing cooperation to alleviate trade troubles and mobilizing favorable public opinion for the good of the industry.

The meeting was held in the chamber of the House of Representatives at the state capitol and was attended by 156 representative men in the trade, mostly dealers, who spoke for local associations in 60 cities and towns, representing 689 members.

### LIMA WINS AMERICAN CUP RACE

Buenos Aires, Argentina, Nov. 1—(By mail)—The American cup race, held under the Buenos Aires Automobile Club over a course 200 kilometers in length, was won by F. Serra Lima, driving a Hudson at an average speed of 57 kilometer per hour. This race is held five times around a 40 kilometer circuit from Moreno to San Miguel and return, and

was negotiated by the winner in 2 hrs. 44 min. 54.2-5 sec. Second and third places were won by a Lancia in a special racing car. Fourth and fifth went to a Hudson and a Ford, with Chevrolet, Elgin and Hudson in sixth, seventh and eighth. The race was held on Oct. 16.

## Packard Loss Is \$987,366; Surplus Now \$15,923,895

Detroit, Nov. 14—Packard Motor Car Co.'s annual report read at the stockholder's meeting Nov. 10 showed an operating loss for the year of \$987,366. Of this \$389,347 was chargeable to the factory and \$598,018 to branches. After paying dividends on preferred stock and setting aside reserves for contingencies, the surplus showed a reduction of \$4,833,776. The surplus now totals \$15,923,895.

The balance sheet showed cash and readily marketable securities of \$10,323,000 and current liabilities of \$3,807,342.

### FORD OCTOBER RUN 87,947

Detroit, Nov. 14—Revised figures on total Ford shipments for October give a total of 87,947, closely approaching the 90,000 schedule set for the month. Early November shipments are continuing high and business is expected to approximate closely the October total.

Foreign trade conditions continue to show improvement. The Manchester, England, plant is turning out over 100 cars and trucks daily. The Copenhagen plant is building approximately 700 cars monthly. Shipments of 2100 cars and trucks were made to the Buenos Aires plant in September and 1650 in October.

### BOILLOT LEAVES HOSPITAL

Paris, Nov. 1—Andre Boillot, seriously injured in a race accident in Belgium early in September, was able to leave the Paris hospital today for his residence in the country, where he will finish his convalescence. Although Boillot's life was never in any danger, his injuries were of a painful and serious nature, his broken jaw in particular giving a lot of trouble. The French race driver expects to be back at his usual occupation at the beginning of next season.

### FIRESTONE CUTS SCHEDULE

Akron, O., Nov. 12—The Firestone Tire & Rubber Co. resumed plant operations after a 10-day inventory shutdown this week on the basis of 18,000 tires a day. This is slightly less than the 20,600 which were on the production ticket when the factory was closed down.

Firestone has led in the production of tires throughout the past year, mainly because of the large amount of Ford business received.

## Senator Townsend Fails to Secure Truck Tax Exemption

### Record Vote in Senate Shows Party Lines Broken With 33 Sen- ators Not Voting

WASHINGTON, Nov. 12—Efforts of Senator Townsend of Michigan to exempt trucks and automobiles from the present two per cent excise tax failed and the internal revenue bill, now in conference, contains this feature which is objectionable to the automobile industry. The Michigan senator used all available parliamentary tactics in order to secure consideration of his amendment which would strike out the proposal of the Senate finance committee to retain the tax. Senators opposing the exemption insisted that the government needed this revenue and that buyers of trucks could well afford to pay it.

Senator Townsend said: "I believe that trucks and automobiles are two of the things that ought not to pay a tax any more than any other vehicle of transportation should pay a tax. I think the prosperity of the country to a great extent depends upon these vehicles. They are already paying a heavy tax. The automobiles and trucks pay, perhaps, a heavier tax than is paid by the various implements that are used by the people. They are virtually supporting the roads; they are maintaining the roads, and in

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## GMC Completes Models of Air- Cooled Engines, Says DuPont

Detroit, Nov. 14—P. S. DuPont makes the following announcement regarding the air-cooled type of motor which the corporation is developing:

"General Motors Corp. has been experimenting for several years past with air-cooled types of motors, as also it has been developing other types of motors and improvements incident to automotive practice. This work is conducted by a subsidiary of the corporation known as the General Motors Research Corp., located at Dayton, O., under the direction of C. F. Kettering.

"The development of the air-cooled motor has reached a point where experimental models have been completed. Exhaustive study and tests are now being conducted. As to the time when production will commence, what manufacturing divisions of the corporation will develop and sell this model, all of this must, of necessity, be held in abeyance until such time as the experimental development work is finally completed, and the corporation is assured that these new products, which it must necessarily stand sponsor for, are everything that might be desired."



# Tire Prices At Lowest Level

## Smoot Says Sales Tax Sure to Be Enacted Before Long

**Present Revenue Bill Not Satisfactory to Many Interests; Soldiers' Bonus Demanding Attention**

WASHINGTON, Nov. 12—Though the manufacturers' sales tax and a general sales tax have been rejected by the Senate and House, it appears that it will ultimately be adopted as a substitute for the new internal revenue bill. The manufacturers' tax of three per cent, sponsored by Senator Smoot of Utah, had the endorsement of the National Automobile Chamber of Commerce and various other organizations of manufacturers. Senator Smoot offered it as an amendment to the tentative tax measure as a means of repealing special war assessments, including the excise tax.

Statements made by several senators and congressmen this week indicate that an effort will be made to replace the tax bill which will be adopted at this session by a sales tax. The advocates of the sales tax plan say that it may be a leading issue at the congressional elections next fall.

### Senate Discards Bonus

The Senate has discarded the soldiers' bonus plan at this time. It is in accordance with recommendations of the President. Chairman Fordney of the House committee on ways and means and certain senators insist that it will be adopted at the regular session this winter. The President is opposed to this program, but congressmen who are candidates to succeed themselves may override his objections for political gain in their home districts.

As indicative of the trend of affairs, Senator Smoot said that talks with senators made it "quite evident that a sales tax will be imposed in the very near future, and every criticism that has been offered to the administration of the manufacturers' tax will apply next year when, it is said, we will adopt a sales tax bill, as much as it would apply today. I have not a doubt in my mind that a bonus bill will be enacted into a law. In my opinion, if the sales tax is to be imposed for the purpose of paying the soldiers' bonus, it ought to be put into operation as early as possible."

Ordinarily the internal revenue bill, when revised, endures during the four years allotted to each administration. However, the farmers' organizations and other groups are not entirely satisfied with the proposed measure which will undoubtedly become a law late this month. The National Board of Farm Organizations appealed to Congress this

week in an effort to prevent the repeal of the excess profits tax and lowering of the surtaxes. They are also opposed to the sales tax which, they claim, shifts the burden to the poor. Much depends upon the attitude of the so-called agrarian block as to whether the sales tax is adopted next year.

## Henry Leaves Ballot Works to Design Faster Sunbeams

Paris, Nov. 1—Ernest Henry, for the past three years chief engineer of the Ballot racing department, will shortly leave that organization to take charge of the technical racing bureau of the S. T. D. syndicate. In this capacity Henry will be responsible for the design of the Sunbeam, Talbot-Darracq and Talbot racing cars.

Engineer Henry first attained prominence as technical head of the Peugeot racing team, where he worked in conjunction with the late Georges Boillot, the late Paul Zuccarelli and Jules Goux. For several years these cars won practically all races in which they were entered. Immediately after the war Henry joined the Ballot company and was responsible for the eight-cylinder racing Ballots which came to Indianapolis in 1919, 1920 and 1921.

Jean Chassagne, now a member of the Ballot racing team, will join the Darracq-Sunbeam racing organization at the end of this year. Chassagne has already had long experience with Sunbeam, having been a member of this firm's racing team from 1912 to 1914, and having been connected with the aviation engine department of the company during the greater portion of the war. Next year he will drive Talbot-Darracq and Sunbeam racing cars in all the leading events.

### DEALERS FIGHT OHIO LAW

Columbus, O., Nov. 14—A conflict between the Ohio Automobile Assn., consisting of about 65 automobile clubs in the state with a membership of about 50,000, and the Ohio Automotive Trade Assn., of which E. J. Shover of Columbus is secretary, has arisen over the Atwood law. The law provides for the giving of bills of sale in the transfer of used automobiles, the bills of sale being filed with the county clerk. The plan is to prevent thieving.

Secretary E. J. Shover of the Ohio Automotive Trade Assn., in a notice sent out to the membership, asks for a fund to carry on the fight against the measure.

Charles C. Janes, secretary of the Ohio Automobile Assn., in a recent statement, says that thieving has been reduced fully 50 per cent in the state since the law was enforced, and that his organization will do all in its power to keep the measure on the statute books.

## General Price Reduction Follows Firestone's Lead

**Cords and Fabrics Now at Lowest Points in History of Rubber Industry**

AKRON, O., Nov. 15—Automobile tire prices have gone to the lowest level in the history of the tire industry, with announcement of drastic price reductions, effective Nov. 15, by most of the major tire companies of Akron.

The long expected break in tire prices came Nov. 12 and followed leads taken by the Firestone Tire & Rubber Co. of Akron and Mason Tire & Rubber Co. of Kent, both of whom made price revisions Nov. 1. Firestone cut 20 per cent on cord tires, 10 per cent on fabrics and 10 per cent on truck tires. Mason made a blanket cut of 15 per cent.

Goodyear, Miller and General simultaneously announced their new price schedules Saturday. No announcement at the time was forthcoming from the Goodrich

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## Miniger Denies He Is to Leave Willys-Overland

New York, Nov. 12—The following statement has been received by MOTOR AGE from C. O. Miniger, president of the Electric Auto-Lite Corp., and vice president of the Willys Corp.:

"There is positively no truth in the rumor that I am to leave the Electric Auto-Lite Corp. and my Willys connections to go elsewhere. I have never considered it in the past and am not considering it now. The statement which has gone forth is absolutely false. I have accepted a directorship in Durant Motors of Indiana and probably will become a director of Durant Motors, Ltd., of Canada, but that will only strengthen the business position of the Electric Auto-Lite Corp."

Miniger's election as a director of Durant Motors of Canada has been announced in the Dominion. Up to this time he has not been elected a director of Durant Motors, Inc., parent of the various Durant subsidiaries. It is understood his contract with the Willys Corp. will not expire until next July. It was stated in MOTOR AGE of last week that he would leave the Willys organization some time before Jan. 1. In view of his contract this evidently was in error.

### COUNCILMAN HURT IN ACCIDENT

New York, Nov. 12—Lee Councilman, former sales manager for the Chalmers Motor Car Co., was dangerously injured when his car was struck by a Long Island railroad train at Beechhurst. His recovery is expected but he may lose the sight of one eye.

## Truck Terminal to Follow Flour City Jobbers' Request

### Union Freight Station Is to Replace Sixteen Widely Separated Shipping Depots

MINNEAPOLIS, Nov. 12—The Minneapolis Truck Terminal, Inc., is a new corporation to establish a joint motor truck terminal as the outcome of action by jobbers who objected to the expense and the loss of time in using the several existing terminals of the 16 operating lines for delivery of goods. The company is a mutual service corporation and expenses will be prorated.

A temporary terminal will be established and a permanent terminal is expected to be built. Business will be increased 25 per cent, it is prophesied, by this new cooperative move, which in reality will be a perpetuation of the business established two years ago and which the wholesalers threaten to abandon under the many unit type of terminals.

Officers of the corporation are: president, H. R. Belitz; vice-president, W. L. Ward; secretary, F. P. Raymond; treasurer, J. Hamlett.

Of 60 trucks in the combined fleet of four to five-ton trucks, at least 40 are in daily use, which carry more than 20,000 tons of merchandise a year within a hundred-mile radius, valued at between \$4,000,000 and \$10,000,000.

It is estimated that overhead of the interested truck companies will be cut in half, that the terminal will be more easy to find and therefore will be a greater factor in the city's business prestige, and that there will be enough more business for the companies to permit a rate cut. Among the principal outbound terminals are Rochester, 91 miles; Milaca, 7 miles; St. Cloud, 63 miles, and Hutchinson, 58 miles.

### SHOW FOR SPRINGFIELD

Springfield, Mass., Nov. 11—Unusual interest was shown in Enclosed Car Week, Nov. 14. In addition to special displays in salesrooms of the 28 establishments embraced by the Springfield Automotive Dealers' Assn., it was decided to hold an enclosed car show Nov. 17, 18 and 19, for which space has been engaged in the new salesrooms of Chandler Motors of Springfield, Inc.

### ALL ATTENDING CHURCH NOW

Wilmington, Del., Nov. 11—St. Paul's M. E. Church here has inaugurated a system of church police for the protection of motor cars owned by members. As cars have been stolen from in front of the church while services were in progress, it has been decided to have them watched hereafter. Since the move was inaugurated no cars have been stolen.

### STUDENTS VISIT NASH FACTORY

Kenosha, Wis., Nov. 11—The plant of the Nash Motors Co. appears to have become the mecca for students of engineer-

ing. The factory here recently has been visited by large delegations from the Milwaukee School of Engineering and Purdue University. Students of the University of Wisconsin will visit the plant Nov. 16 and parties from the universities of Illinois and Iowa are expected later in the fall. Most of these schools have made the inspection of the Nash factory an annual feature of their regular work.

## Jitney Shoves Dobbin Off the Block

BRIDGEPORT, Conn., Nov. 11—In general replacement of horses by motors, for both city and rural use, occasional speculation has been heard as to what will be the fate of the historic New England horse traders' and auction stables. This is answered by recent advertisements of Hamilton Brothers, one of the best known firms of horse dealers and auctioneers in the state, whose stables in New Haven and Hartford have long been headquarters for horsemen. The historically familiar advertisements this week had this significant line, "Watch for our big opening sale of automobiles on auction."

### SERVICE MANAGERS' CONVENTION

New York, Nov. 12—The program for the Service Managers' Convention, which was held Nov. 15 and 16 under the auspices of the National Automobile Chamber of Commerce, was quite different from any of the previous conventions in that instead of having a great number of papers read by various service executives, there were only two such addresses. The remainder of the time was given up to topics for discussion on live subjects of the day and the service department.

### CHEVROLET DEALERS MEET

Kalamazoo, Mich., Nov. 11—Chevrolet motor car dealers from many points in southwestern Michigan gathered here to meet factory representatives and receive first-hand information on the intensive sales drive that has been inaugurated by the Chevrolet Motor Car Co.

C. E. Dawson, sales manager of the company, headed the factory representation. With him were H. J. Day, E. W. Doty and Carl Wethered, factory field men.

### SUIT AGAINST CHICAGO FIRM

Chicago, Nov. 11—Suit has been instituted in the United States district court against the Illinois Starter & Magneto Co., Chicago, by the Connecticut Telephone & Electric Co., Meriden, Conn., claiming infringement on patents which cover the breaker plate.

### STANDLEY GRANTED PATENTS

Boone, Ia., Nov. 11—Patents have been granted covering the Standley luggage carrier using the lazy tongue construction. The Bersted Mfg. Co., Chicago, has been granted licenses under the Standley patents using the Bersted name.

## Automobile Show Circuit Is Planned for Michigan

### State Trade Association Is Behind Move to Aid Features and Reduce Exhibition Costs

DETROIT, Nov. 12—By enlisting the cooperation of the factory and larger distributors, the Michigan Automotive Trade Assn. is planning to make the coming season shows throughout the state the most important, in a merchandising way, that have yet been held.

Plans, as outlined, call for the formation of a show circuit which will include 13 cities outside Detroit, the shows to be held at non-conflicting dates with an interval of a few days between.

The plan is to move the exhibits from one city to the next. The first would be held preceding the Chicago national show, the second would start following the Chicago show and the rest would continue through to April. Manufacturers and big distributors would be asked to furnish special painting jobs, cutaway chassis and engines and such other features as are not customarily seen at the smaller shows. With special features such as these, it is expected much more interest can be secured in the shows than with the mere showing of usual stock models.

The association's aim is to increase the drawing power of the shows and at the same time to reduce the expense of conducting them by standardizing decorations, show cards, etc. In each city, through the use of farm lighting equipment, a special appeal will be made for farmer attendance.

Representatives of the following cities will meet with W. D. Edenburn, secretary of the state association, at the Detroit Automobile Dealers' Assn. offices, Nov. 22, to consider plans: Kalamazoo, Battle Creek, Benton Harbor, Jackson, Lansing, Flint, Saginaw, Bay City, Port Huron, Pontiac, Ann Arbor, Grand Rapids and Muskegon.

### LOUISVILLE SHOW UNDER WAY

Louisville, Nov. 11—Plans are now under way for the fourteenth annual Automobile Show to be given at the armory Feb. 20 to 25 by the Louisville Automobile Dealers' Assn. Committees will be appointed within the next few weeks and active work begun on the allotment of space and other details. Indications are that space will be in greater demand than ever before.

### NO TAX FOR ANTI-FREEZE

Bridgeport, Conn., Nov. 11—In response to multiple inquiries made of internal revenue officers relative to the legality of using alcohol in automobile radiators to prevent the freezing of radiator water in cold weather, Chief Deputy Collector Howard P. Dunham has ruled that no permits are required or government taxes expected for the use of denatured alcohol.



## Lincoln Motors Bankrupt; Reorganization to Follow

### Short Sales, High Priced Inventory, General Business Depression Contributing Causes

DETROIT, Nov. 11—Lincoln Motor Co. was placed in the hands of the Detroit Trust Co., as receiver, following a directors' meeting Nov. 8 at which decision to make voluntary application for receivership was carried by a vote of six to three. President Henry M. Leland, Vice-President Wilfred C. Leland and William T. Nash, secretary and treasurer, voted against the action.

A statement by the Detroit Trust Co. places the assets of the company at \$14,800,000 and liabilities at \$8,237,280. The assets include land, buildings, machinery and other plant investments, \$7,800,000; tools, merchandise (including finished cars and cars in process), \$3,700,000; cash, accounts and bills receivable, \$800,000; other assets, \$2,500,000. Indebtedness includes merchandise accounts, \$1,868,000; obligations to banks fully secured by indorsements, aggregating \$4,250,000; a mortgage for \$1,882,000, and land contracts, \$237,280.

The factory is continuing on its regular manufacturing schedule pending decision by the receiver as to a course of action. Plans for reorganization are under consideration so as to continue production with the least possible interruption.

The following telegram was sent to Lincoln distributors by President Leland: "Over our protest the board of directors of the Lincoln Motor Co. has consented to the appointment of a receiver. The Lincoln car during a period of unprecedented financial difficulties has demonstrated its supremacy in the automobile world, and while this receivership will compel a reorganization of the company, we are starting with undaunted courage to build a greater and more united organization to carry the enterprise to complete success. We are confidently counting upon the loyal cooperation of our distributing organization and of the whole Lincoln personnel. We hope and expect that the receiver will carry on the manufacturing departments so that you can keep your business intact and will use every effort to hasten the time when the new Lincoln company can again give you the support that your splendid work deserves. With your advice and cooperation we are bound to succeed. Please tell your dealers and all our friends that the Lincoln company is making a fresh start on the road to success."

Regarding the causes for the receivership, President Ralph Stone of the Detroit Trust Co., said: "The company perfected its models and incurred the initial expense necessary to place them upon the market just prior to the beginning of the period of depression which has adversely affected all kinds of business. This preparation involved the in-

stallation of factory machinery, special tools, and the purchase of a large inventory at the peak of high prices.

"This placed a financial burden on the company which was more than its financial resources could properly sustain, in the absence of a volume of sales which, under conditions in the automobile industry and in business generally at that time, it was fully expected would be made.

"The management of the company was encouraged in this belief by the favorable reception of the new models by purchasers of high-class automobiles, and this has been borne out by the fact that the sale of Lincoln cars has increased steadily, and for September and October has been the largest since the company started manufacturing."

## Criticizes Service With a Gun

ATLANTA, Ga., Nov. 12—This is a story having to do with service. It presents an unanswerable argument in favor of good workmanship.

A. L. Jones owns and operates a garage and service station at Hillsboro, Ga.

Ike Alexander is a farmer living near Hillsboro.

A few days ago Alexander brought his car to Jones and had some necessary repairs made thereon. Not satisfied with the workmanship when the job had been completed, he carried the car back to Jones and an argument ensued. There was a fight, in the course of which Jones is alleged to have hit Alexander with a hammer handle. Alexander drew a revolver and shot Jones twice, probably wounding him fatally.

## CALIFORNIA SALES IMPROVE

Oakland, Calif., Nov. 11—Conditions in the automotive merchandising industry throughout California are improving, though business is slower in some sections than in others, according to Robert W. Martland, secretary-manager of the California Automobile Trade Assn., who has just completed a trip of several thousand miles through California, in which he held meetings of bankers, business men and automobile dealers in more than 50 cities and towns. The association of which Marsh is the head is largely concerned with garage and repairmen, though automobile dealers also are members of it; hence, Marsh's statement of conditions deals largely with the repair and equipment branches of the industry.

## ANNUAL TRADE MEET

Greenville, S. C., Nov. 12—Dec. 8 is the date for the annual meeting of the South Carolina Automotive Trades Assn., which will be held this year in this city. Announcement of speakers for the meeting include: Ray W. Sherman, Alfred Reeves from the national field, and Dr. D. W. Daniel.

## Seasonal Decline Is Noted in Sales as Winter Looms

### Business, However, Is Spotted and Certain Sections Report Encouraging Volume

ATLANTA, Ga., Nov. 12—With but very few exceptions, dealers and distributors in Atlanta experienced a material decline in sales during October as compared with September, though the demand continues unusually good for enclosed cars, and in the case of some dealers is such that they are unable to secure all of the enclosed cars they can sell.

The decline in sales began early in October and by the latter part of the month had reached an exceptionally low mark. During the last two days of October, for example, only 16 licenses were issued at the state capitol building for retail sales in Atlanta, and during the first two days of November the total was only 19. The latter part of September and the early part of October sales were at least twice as large as this.

The Atlanta branch of the Buick Motor Co., serving Georgia, Florida, Alabama and part of Tennessee and South Carolina, found gross sales 15 per cent less in October than in September. Compared with 1920, however, sales are materially better. September was the best month of 1921, with October ranking second best.

Black & Maffet, Dodge Brothers distributors in Georgia, found business for October of this year 50 per cent better than the same month in 1920. Enclosed car demand is unusually good, and light truck sales are picking up.

The Packard Enterprises, Inc., did a \$200,000 retail business in this territory during September, but hardly half that amount in October.

The large service stations of Atlanta report the repair business off between 40 and 50 per cent, with the outlook not favorable for the coming winter months.

Total sales of 2739 cars were reported by Ford dealers in the southeastern territory under the jurisdiction of the Atlanta factory branch during October, a volume in excess even of the best monthly record during the spring boom of 1919. February, 1919, was the best month during that period, when total sales were 2170 cars. In money volume October sales of the Atlanta branch approximate \$1,250,000. The principal demand was for enclosed cars.

Usually when such unusual records have been made in the past it was because dealers held hundreds of orders in file which they were unable to fill over a period of several weeks, but in this instance very few such orders are included in the October total. Orders now held by the Atlanta branch for November delivery are almost equal to the entire total for October, indicating that the present month will witness an even larger volume than last month.

## BUSINESS NOTES

Stewart Mfg. Co., Oakland, Calif., is making a line of specialties designed for Chevrolet cars and includes gear shift anti-rattler, steering gear anti-rattler, valve tappet silencers, spring hood clamps, non-oil tale-up bushing and numerous bits of handy shop equipment.

Sparks-Withington, Jackson, Mich., has brought into the market for its motor horns an adjustable bracket, which through adjusting parts, will fit over 100 various cars.

Witherbee Storage Battery Co., Inc., New York, for the second time this year is forced to increase its manufacturing facilities. This second increase is an addition to the Belleville, N. J., plant, where, before Jan. 1, the entire activities of the company will be centered.

Martin Motor Co., Springfield, Mass., is trying out a third model of its two-passenger car proposed to be manufactured there. From a competitive test of the three, the most satisfactory will be chosen for commercial production. The special aim of the company is to reduce size and weight without loss of strength. Principal materials will be duralumin, aluminum and aluminum alloy.

Champion Mfg. Co., Philadelphia, reports that since its price reduction the sales curve representing the demand for its reboring equipment has climbed steadily upward, proving beyond a doubt that business conditions are greatly improved.

William A. Henderson, manager of the Dort Motor Car Co.'s plant, Kalamazoo, has resigned his position and returned to New York City, his former home. There is speculation going on regarding the future of this division of the Dort company.

Wayne Oil Tank & Pump Co., Fort Wayne, Ind., has paid its ninety-first consecutive common stock dividend.

### 50 Class Journal Employees Take Course in Journalism

New York, Nov. 11—Fifty employees of the Class Journal Co., representing all departments and including a half dozen young women, attended the first lecture in the School of Industrial Journalism, which has been established by the publishers of the leading business papers of the country. The purpose of the course, which will cover 30 weeks, is to make the papers in the industrial field more valuable to their readers by means of a better rounded training for those who get them out. The first lesson was devoted to the fundamentals of business publishing, and the lecturer was M. C. Robbins, editor of the "Gas Age."

### ACCIDENTS CAUSE 9103 DEATHS

Washington, Nov. 11—Statistics compiled by the Bureau of the Census show that there were 9103 deaths in 1920 resulting from accidents caused by motor vehicles, exclusive of motorcycles, which represents a death rate of 10.4 per 100,000 population, as against 9.4 in 1919, an increase of about four-fifths.

The actual number of deaths resulting from motor vehicle accidents in the 25 states from which data for 1915 are available increased from 3571 in that year to 7433 in 1920, the rate of increase being 108.1 per cent. During the same period, according to data obtained from the Bureau of Public Roads of the Department of Agriculture, the number of registrations of automobiles, motor trucks and commercial motor vehicles in the same states increased from 1,767,055 to 6,085,150, the rate of increase being

Dewey-Collins, with offices at 50 West 77th street, New York, has been formed to act as manufacturers' sales agents. The company is composed of Martin A. Dewey, Jr., who formerly was with the Gemco Mfg. Co., and later sales manager for the Buckley Ralston Co., of this city, and Thomas A. Collins, who formerly was with the A. J. Picard Co., of New York. They already have taken on the products of several manufacturers.

Henry M. Butzel purchased the property of the Hinkley Motors Co., valued at \$450,000, when it was sold at auction by the Security Trust Co., as receiver. His bid was \$300,000 and is subject to confirmation by the United States district court. A conditional bid of \$10,000 for the Hinkley accounts also was made. Butzel stated the business of Hinkley Motors would be continued by a new company.

McKone Tire & Rubber Co. has been organized with general offices in Chicago, and a factory at Millersburg, O., to manufacture fabric and cord casings and inner tubes. A. L. Gustin is president of the company; C. W. McKone is vice president, in charge of production; L. C. Conley is secretary and treasurer, and O. L. Tweedy is sales manager. All are residents of Chicago.

Star Rubber Co., Akron, O., stockholders' meeting called for Nov. 5 to approve the re-financing and recapitalization plans, was postponed until Nov. 25. The plan as outlined to the stockholders by letter, provides for decreasing the capitalization of the company, exchanging existing \$100 par common stock for no par and increasing the directorate from five to seven.

Advance Automobile Accessories Corp., Chicago, has absorbed the Rochester Woven Belting Corp., of East Rochester, N. Y. This plant is known among the jobbing trade as the "Empire Plant."

244.4 per cent. The death rate per 1000 motor vehicles in use in the 25 states in question decreased from 2 in 1915 to 1.2 in 1920, being only three-fifths as great in the later as in the earlier year.

### BETTER PACKING TO RESULT

Chicago, Nov. 12—"Perfect Package Month," in which the Postoffice Department, the express companies and the railways are to take active part, is announced by Postmaster Lueder of Chicago. It is the object of the campaign this month to teach better packing of all shipments that enter into the great transportation systems of the country. Great loss to shippers results each year from the fact that little attention, in so many cases, is given to packing. These losses are especially heavy during Christmas shipping, and it is to reduce these losses, as well as many others, that the campaign is started at this time.

### SAN FRANCISCO ASSN. ELECTS

San Francisco, Nov. 11—The Motor Car Dealers' Assn. of San Francisco held its annual election of officers recently and chose W. F. Culberson, head of the Pierce-Arrow Pacific Co., as president; Roy Alexander, of the Peacock Motor Co., vice-president; G. A. Urquhart, manager of the White Co. of California, secretary; and Chester N. Weaver, head of the Studebaker distributing company bearing his name, treasurer. A board of directors consisting of 28 members of the association was formed, and an executive committee organized from this board to have charge of the work of the association. Earl C. Anthony was named chairman of this committee.

## Studebaker Fall Business Shows Large Gain Over 1920

### Net Profit Increase for September Quarter Equal Almost to \$1,000,000

SOUTH BEND, Ind., Nov. 15—The Studebaker Corp. today declared the regular quarterly dividends of 1½ per cent each on its preferred and common stock, both payable Dec. 1, to stock of record Nov. 10.

During the quarter ended Sept. 30 last, the corporation showed net profits of \$3,263,201, as compared with \$2,286,794, an increase of \$976,407 over the same period of 1920. For the nine months ended Sept. 30 last, net profits amounted to \$9,644,326, against \$9,765,851 in the same nine months of 1920, involving a decrease of \$121,525.

The earnings statement for the quarter and nine months ended Sept. 30 compares as follows with the same period last year:

|                                | 1921         | 1920         |
|--------------------------------|--------------|--------------|
| No. cars sold.....             | 21,086       | 15,765       |
| Sales and receipts.....        | \$29,058,893 | \$27,823,611 |
| Net earnings .....             | 4,263,201    | 3,179,572    |
| Reserved for federal tax ..... | 1,000,000    | 892,777      |
| Net profits .....              | 3,263,201    | 2,286,794    |
| From Jan. 1—                   |              |              |
| Cars sold .....                | 55,552       | 41,092       |
| Sales and receipts.....        | \$80,593,998 | \$73,374,153 |
| Net earnings .....             | 11,644,326   | 12,208,629   |
| Reserved for federal tax ..... | 2,000,000    | 2,442,777    |
| Net profits .....              | 9,644,326    | 9,765,851    |

The profit and loss surplus as of Sept. 30 last, stood at \$15,396,874, as compared with \$9,822,048 on Jan. 1, 1921, an increase of \$5,574,826; cash in banks and on hand, \$9,332,846, compared with \$4,226,234; inventories on the same date were \$20,594,985, against \$28,076,793 on Jan. 1 last, a decrease of \$7,481,808; total quick assets were \$41,491,167, against \$41,367,497, with current liabilities of but \$11,161,161,791, compared with \$16,337,164 on Jan. 1, 1921.

### HARE'S MOTORS ASSIGNS

Bridgeport, Conn., Nov. 11—Hare's Motors of Connecticut, Inc., formerly selling agents in the state for the Locomobile Co., has filed a voluntary petition in bankruptcy in the United States court at New Haven. The corporation lists its liabilities at \$59,302.55 and its assets at \$34,061.52. It had offices in this city at 171 Stratford avenue, and a sales and parts station in Knowlton street. Branch offices were also maintained at Hartford.

### SERVICE POST-GRADUATE COURSE

Detroit, Nov. 12—The Michigan Auto School of this city has installed an advanced course for experienced automobile mechanics. The course is aimed to perfect the garageman in points where he may be weak, and especially to make him expert in diagnosing and repairing electrical troubles. The course is complete in every respect, and is so arranged that it takes very little time to complete it.



## CONCERNING MEN YOU KNOW

R. C. Rueschaw, sales manager of Reo Motor Car Co., is on a month's trip through the east and south, making a survey of business conditions.

George A. Richards has resigned as Detroit district manager for Firestone Tire & Rubber Co., to become manager of a department for Fisher Body Corp. He has been succeeded in the Firestone office by L. R. Jackson, formerly branch and district manager in California and Minneapolis.

LeRoy Kramer, formerly in charge of production for the Willys-Overland Co., Toledo, has been elected president of the Rochester Motors Corp., in addition to his duties as western representative of the T. H. Symington Co., Rochester, N. Y. Lorimer Dunlevy, formerly chief inspector of the Willys Corp., and later service manager of Rochester Motors, has been appointed works manager. C. J. Symington has been made chairman of the board.

Frank Smith, who, with his father, C. W. Smith, was engaged in the automobile business, La Grange, Ga., for some years, under the firm name of C. W. Smith & Sons, died early in November at Panama Springs, Fla., at the age of 25 years. He was well known in the automobile business throughout Georgia.

R. E. Chamberlain has been promoted to the position of general sales manager of Packard Motor Car Co. Since December, 1920, Chamberlain has been assistant general sales manager, and since 1916 has been connected with the company in other capacities.

R. P. Henderson, who has been vice president and director of sales for the western territory of Martin-Parry Corp., body builders, has been transferred to a new Detroit office, where he will be regional director of sales in charge of branches at Detroit, Cleveland, Columbus and Cincinnati. It is understood that other branches will ultimately be established and included in his territory.

### Busy Winter in Sight for Coast Automotive Dealers

San Francisco, Nov. 11—Automobile dealers and distributors, equipment men and garage and repairshop operators are going to be busy all winter. Immediately following Enclosed Car Week, which ended on Nov. 14, was held a "Pride of Ownership Week," in which hundreds of automobile owners, taxicab companies, automobile rental companies and dealers agreed to keep their cars right up to the top-notch of efficiency and cleanliness, so as to impress on the city and the people who own cars just what can be done by the owner to maintain the beauty, retain the value and obtain all the service in a passenger car.

From Jan. 20 to 26 will come the third annual Automobile Equipment Exposition, to be held in the municipal auditorium. Automotive Equipment Week, which will run at the same time as the exposition, will bring nearly every equipment, garage and repairman west of the Rockies to San Francisco, if the present extensive plans go through. Then, in February, will come the annual San Francisco Automobile Show.

### BANKER ADVISES DEALERS

Memphis, Tenn., Nov. 11—Steve H. Butler, president of the Memphis Automobile Dealers' Assn., welcomed 87 of the members at a dinner and smoker recently at the Colonial Country Club.

Dwight M. Armstrong, one of the speakers and president of the Central State National Bank, said that when an automobile company approaches a bank for a loan, all things being equal, it

W. H. Olmstead has been appointed sales manager of Carlisle Tire Corp., and will be located at the factory at Stamford, Conn.

J. L. Irving has been appointed general manager of the Rock Island Plow & Tractor Co., with headquarters at Rock Island, Ill.

Truman Berry and Charles Sanderson, bankers and capitalists of Whittier, Calif., have been elected to the board of directors of the Leach Biltwell Motor Car Co., of Los Angeles. They were named at a special meeting to fill two vacancies in the directorship. Berry was allotted distributor's territory in Orange county, Calif., and vicinity, for the Leach Power Plus Six.

Myron E. Forbes, who has been treasurer of the Pierce-Arrow Motor Car Co. since August, 1919, has been made vice president of the company. He will continue to act as treasurer, too.

John J. Clark has been appointed manager of the Seattle branch of the Spreckels "Savage" Tire Co.

Frank M. Germane has resigned as director and sales manager of the Marlin-Rockwell group. His present duties will cease on Dec. 31, with all the companies in which he is an officer, these connections including his directorship in the Standard Steel & Bearings, Inc., as well as its subsidiary, the Standard Sales & Service—companies that are easily identified as the old Standard Roller Bearing Co.

James L. Geddes, chairman of the board of directors of the Kelly-Springfield Motor Truck Co., who was stricken with paralysis a few days ago, is improving.

Charles W. Dolby, proprietor of the South Street Garage, Pittsfield, Mass., and one of the most prominent automobile dealers in this section, was instantly killed when an automobile in which he was a passenger, left the highway at a sharp curve, went through a fence and rolled down an embankment. His skull was fractured.

should have the same consideration as cotton men, lumbermen, etc.; but that in many instances automobile merchants, by placing their endorsement on paper covering time sales which should be shown on a balance sheet as a contingent liability, did business all out of proportion with the capital of the company; and further, that in making many of these trades, used cars are taken in at an exorbitant price and the balance sheet shows that all of the money advanced by the bank is tied up in unliquid assets in used cars, when in many instances they are junk. He said that for an automobile company properly to maintain its credit, it was necessary that it keep the volume of business within the capital invested, and also keep the capital in liquid assets; that in most cases the money advanced by the banks is for the purchase of new cars, and not used cars or junk; that the automobile merchant must not be over-anxious to put cars on the street regardless of whether it means a profit or a loss to him.

### RUMOR NAMES GOODYEAR PROFITS

Akron, O., Nov. 11—All preparations have been made by the new management of the Goodyear Tire & Rubber Co. to send to its stockholders a statement of operations and business during the six months the plant has been in the new hands.

Reports coming to brokers state that the company will show a surplus of more than \$25,000,000 and that earnings have been on the basis of \$15,000,000 a year thus far.

It is expected that the report will be made public within the next few days.

## Dealers Find Cash Results Follow Sales Conventions

### Atlanta Buick Organization Proves Value of Merchandising Meeting In September-October Test

ATLANTA, Ga., Nov. 12—In order to determine whether or not dealers and salesmen get any real value out of the sales and merchandising meetings that are frequently held in Atlanta by the local branch of the Buick Motor Co., Benjaim F. Ulmer, assistant manager of the branch, placed under observation during September and October a selected list of 107 Buick dealers in Georgia, Florida, Alabama, South Carolina and Tennessee, who attended a convention of this nature in Atlanta during August, the first that had been held in several months.

Of this group of 107 dealers there were 32 who, during August, made no retail sales whatever; during September these same 32 dealers reported a total of 61 sales. There were 35 of the 107 who, during August, each sold one car; during September these 35 dealers reported a total of 56 sales. There were 40 of the 107 who were more experienced dealers located at the larger points, and who, during August, sold 139 cars; during September the sales of these 40 dealers were 109, or a decrease of 30.

This would seem to indicate beyond any doubt that the sales convention is certainly worth while to the dealer who really takes an interest in it and endeavors to profit by practicing the knowledge he gains at such a meeting. It evidences, too, that the dealers in the large centers are not as susceptible to the acquirement of such knowledge as are the dealers in the smaller cities and towns, as shown by the analysis of the sales of the 107 who were under observation. If this were not true there would not have been such a difference between the sales during August, before the merchandising meeting was held, and during September, after it was held. Analysis of October sales has not been completed, but indications are that the ratio will run about the same.

As a result of what the analysis brought to light, the Atlanta branch of the Buick Motor Co. will hold these sales conventions every few months.

### GIVE SARLES MORE SPEED

Cotati Bowl, Calif., Nov. 11—Officials of the North Bay County Speedway Assn. have just announced that an erroneous statement as to the speed made by Roscoe Sarles, winner of the 150-mile race here, Oct. 23, was given out by them at the conclusion of the race. The officials now state that the time actually made by Sarles was an average of 110.32 m.p.h. instead of the 108 m.p.h. announced previously. This is a few seconds slower than the time made by Eddie Hearne at the opening of the bowl some weeks ago. Hearn's record still stands for a bowl.

## General Price Reduction Follows Firestone's Lead

### Cords and Fabrics Now at Lowest Points in History of Rubber Industry

(Continued from page 25)

company. The cuts range from 10 to 30 per cent.

The significance of the new price schedules is the fact that they bring tire prices to below their pre-war levels by nearly 15 per cent. Another outstanding feature is the fact that the larger cuts are made in prices of cord tires, thus cutting almost in two the margin of price difference between cord and fabric tires, and making it possible to buy cord tires within 25 or 30 per cent as cheaply as fabrics.

The Goodyear cuts announced are 30 per cent on the 3½-inch and 4-inch straight-side cord tires, 26 per cent on the 3½-inch clincher cord tires and 20 per cent on all 4½ and 5-inch cord tires. Cuts on fabric prices range from 10 to 20 per cent. Goodyear makes no announcement of truck tire revisions.

The Miller Rubber Co. cuts cord tire prices from 20 to 30 per cent and makes a 10 per cent cut on fabrics and a cut ranging from 10 to 20 per cent on truck tires. General price cuts are 20 per cent on cords, 10 to 20 per cent on fabrics and 10 per cent on truck tires.

"The new price schedules bring the cost of tires definitely below their pre-war levels, despite the fact that tires today are twice as good as they were a few years ago, according to actual average mileage records," says the Goodyear statement, made in connection with the company's price revisions. "An interesting feature is the fact that the changes announced by Goodyear bring down the margin of difference between fabric and cord tires. The differential between the two types in fact has been cut virtually in two.

New York, Nov. 15—A reduction in prices on its full line of tires, including cords and fabrics for passenger cars and solid and pneumatic tires for trucks, has been announced by the United States Rubber Co. The reduction cannot be calculated on a percentage basis because the prices vary according to type. The 30 by 3½ fabric casing has been reduced to \$10.90 from \$15.75. This heavy cut is said to bring the price of this size lower than it ever has been made by any one of the "big four." It is stated that the announcement of the reduction is made at this time to aid dealers in making their plans for 1922. The new prices, which became effective Nov. 11, will extend to tire purchasers throughout the country.

New York, Nov. 12—The C. Kenyon Co., Inc., announces reductions ranging from 8 to 10 per cent on its various sizes

of cord tires and tubes. It also announces a new line of brown tubes, the price of which range from 30 to 90 cents less than its red tubes. The company announces a new line of heavy service tires and tubes. These tires range in size from 30 by 3½ to 36 by 6. The tubes for this line run in size from 30 by 3½ to 44 by 6.

## Senator Townsend Fails to Secure Truck Tax Exemption

(Continued from page 24)

some of the states they are building the roads by the taxes that are put upon them.

"Every truck is used for a useful purpose, and not for pleasure. It is used in the business of the country and contributes very largely to the carrying on of the business of the country. There are hundreds of thousands, probably at least 200,000, of these trucks owned by farmers, and they are going to be more and more extensively owned and used by them for farm work. There is no more reason why the farmer should be taxed upon a wagon drawn in any other way."

According to Senator Penrose, chairman of the Senate finance committee, "If there is one feature of the tax bill that is not complained of, it is this. The tax furnishes a very substantial revenue; and if the Senate is going to begin to throw overboard taxes to this amount and of this character, we might as well stop entirely attempting to raise sufficient money for the requirements of the government."

In support of Senator Townsend's argument, Senator Heflin of Alabama said: "The Senate should vote to exempt these trucks from the tax provisions of this bill. Surely if the great holding companies of the country can have their millions exempt and the profiteers can have \$450,000,000 handed over to them, the Senate can well afford to take the taxes off the trucks. The automobiles that are used over the country generally should be exempt from the tax provisions of this bill."

Because of the widespread interest of the automobile industry in this question, Senator Townsend was successful in obtaining a record vote on the proposal to abolish the tax. It is interesting to note that party lines were broken, as about one-half of the senators voting against the committee amendment to retain the tax were Republicans. Of the 36 votes cast in favor of the retention of the tax, 27 were Republicans, while 13 members of the same party and 14 of the Democratic party voted against it. Thirty-three Senators did not vote on the measure.

### TO VOTE CHARTER SURRENDER

Columbus, O., Nov. 14—A meeting of the stockholders of the Overland-Dunkle Co. of Columbus was called for Nov. 10, to vote on the proposition of dissolving the corporation and surrendering the charter. The business has been taken over by the C. T. Dunkle Motors Co.

## Dealers Slow to Buy Cars to Meet Early Spring Sales

### Tight Bank Credits and Lack of Price Stabilization Assurance Given As Causes

(Continued from page 24)

improvements or contemplate doing so in the near future. As a consequence, with the price concessions which have been made in the past year, purchasers of cars hereafter will get better value for their money than they have for a long time.

Much interest has been aroused by the affidavit of M. B. Leahy, general sales manager of the Durant Motor Co. of New York, which stated that a total of 24,817 shipping orders had been received at the close of business Oct. 22. If this pace is maintained Durant will be one of the biggest producers in 1922. Deliveries of the "Four" have begun and production will increase steadily. No date has been set for putting the six-cylinder Durant on the market.

Manufacturers' schedules are being curtailed to a greater extent than otherwise would be the case because of their determination to build only for actual sales and dealers generally are not inclined to stock cars heavily for the winter months. This is not due to any skepticism on the part of the dealers as to the future of business but rather to difficult credit conditions. Many dealers, especially in the smaller towns, have found it impossible to finance stocks of cars to carry them over the winter. It is feared that this condition may result in a temporary shortage in cars in some popular lines in the early spring.

While the difficulty in obtaining adequate credit is one of the problems of the dealer, they have become skeptical about reports from factories that the final price readjustment has been made. They do not want to stock a substantial number of cars and then find that the price has been reduced before they have an opportunity to sell them. Dealers almost universally declare that car sales cannot be placed on a solid, substantial foundation until there is a definite stabilization of prices.

### SPRINGFIELD OPENING AUSPICIOUS

Springfield, Mass., Nov. 14—Keen interest on the part of sellers and buyers marked the opening of Enclosed Car Week in this city today. It was decided not to have a combination show this year, but with the concerted policy pursued under the direction of Secretary Stacy of the Automotive Dealers' Assn., each establishment is making a special effort to conduct a strong enclosed car campaign throughout the week, with non-member establishments joining in the movement. It is resolved to make Enclosed Car Week an annual event here. The slogan, "Buy a Closed Car This Week," is proclaimed from every dealer's window and from car windshields throughout this section.



## IN THE RETAIL FIELD

E. Gordon Perry, El Paso, has bought the Dodge dealership in Dallas territory from Cameron & Jackson. The new concern will be the Perry Motor Co. Cameron quits the automobile business and Jackson will take charge of the Dodge dealership at Corsicana.

O'Donnel Motor Sales Co. has been named distributor in Detroit for Peerless and Saxon cars.

S. A. Dwight, Grand Rapids, has been appointed distributor in western Michigan for Gramm-Bernstein motor trucks.

Thayer Morrow, who has retired from the Ford distribution at Bloomington, Ill., becomes distributor for the Dodge Bros. car in the McLean county territory and will also have some contiguous counties. Morrow succeeds the Sill-Pinkerton company.

Edgar W. Taylor and William B. Taylor, operating the Taylor Bros. Garage, Danville, Ill., have disposed of their plant to Herman F. Brown, a farmer, the consideration being \$60,000. The garage ranks with the leading plants of the kind in eastern Illinois. It is understood that Brown purchased the property as an investment and will lease it.

R. E. Herzler Motor Car Co. has been organized at Belleville, Ill., and will operate a sales agency and do a general repair and storage business.

Rue Motor Co., Chicago, has purchased the Thayer Morrow interests in the Ford car and Fordson tractor distribution at Bloomington, Ill.

J. G. Starr & Sons have had the exclusive distribution of Fords in Decatur, Ill., territory for many years. The Talbot-Barry Motor Co., St. Louis, has decided to enter the Decatur territory and has opened an agency.

E. G. Pruner has been appointed Ann Arbor, Mich., dealer for the Anderson "Coach-bilt" Six under Coleman and Meyer, southern Michigan distributor for the Afderson Motor Co.

Earl Franklin Co., Denver, has been appointed distributor for the Anderson "Coach-bilt" Six in Colorado, Wyoming and northern New Mexico.

Thomas E. Larsen, a salesman for Herbert Bros., Broad and Race streets, Philadelphia, distributor of Chandler and Cleveland cars, has been promoted to the head of the used car sales department for both Herbert Bros. and the Cleveland-Herbert Co.

Thomas J. Morrison has been appointed director of retail sales of the Apperson Bros. Automobile Co. factory branch, Philadelphia, under M. L. Corson, manager, and O. Hoffman, formerly service manager for William T. Taylor, Apperson agency, has been appointed service manager for the branch.

### Hartford Dealers Turn Down Trade-In; Standardize Value?

Hartford, Conn., Nov. 11—Hartford dealers are pessimistic at present over the used car situation. Eleven dealers during the calendar year admit they lost \$20,000 on the sale of used cars. The Hartford Automobile Dealers' Assn. has appointed a committee consisting of Russell P. Taber, Fred W. Lycett and C. A. Brenneke to draw up plans by which the situation may be alleviated. It is the consensus of the committee that two courses are open, either to turn down trades entirely or to have all dealers make the same identical allowances.

### DALLAS ON SHORT-HOUR SERVICE

Dallas, Tex., Nov. 11—The gas filling stations and the retail automobile tire dealers and service stations are going to operate six days per week from now on. At a meeting of the combined interests this week it was decided to remain closed Sundays, beginnings at once. This means there will be no filling stations opened, no tires sold and no service rendered on Sundays in the future. In

Hedges Garage, Inc., has been organized at Terre Haute, Ind. The directors are S. T. Hedges, L. M. Hedges and Hazel H. Miller.

Peter Haas, formerly of Haas & Geissler, Holyoke, Mass., has reopened the service garage at South Hadley Falls, Mass., which was formerly owned and run by L. D. Carpenter.

Texas Paige Co., Dallas, with J. R. Roach as president, has taken over the distribution of the Chevrolet lines in the Fort Worth territory. The Chevrolet dealership at Ft. Worth was formerly handled by the Beck Automobile Co. S. C. Webb will be local manager of the Ft. Worth branch and R. S. Townsend will be salesmanager.

Walter J. Harris, Ft. Worth, has taken over the dealership of the Franklin cars in the Ft. Worth territory. The new company is styled the Franklin-Harris Motor Co. In connection with the change, a complete service and parts department for Franklin has been established.

J. W. Charleville, manager of the Dallas Auto Club, has resigned to take charge of the Sunlite Company of McKinney, Tex. President Angell of the club said Miss Clara Bogan, assistant to the manager, would be in charge of the affairs until a new manager is elected.

Tennison & Blair, Dallas dealer for Marmon, Chalmers and Maxwells, is to have a new home. Work has started on a three-story reinforced concrete building with plate glass display fronts of more than 150 ft. on the first floor. The building may be increased to eight stories. It will be completed in four months. The cost of the building will be around \$200,000. Increased business is given as the reason for expanding quarters.

Willys-Overland, Inc., manufacturers of the Overland and Willys-Knight cars, has taken over the Overland Auto Co. here and will establish a branch manufacturing plant to supply Texas and parts of Oklahoma, New Mexico, Louisiana, Arkansas and Arizona. C. B. McNary of Sacramento, Calif., will be in charge of the branch in Dallas. E. C. Power will be wholesale manager and A. W. Irvine, service manager.

W. E. W. Motors Corp., Philadelphia, has been appointed distributor for the new Durant car. The territory includes eastern Pennsylvania and southern New Jersey. George R. Wright is president, Emanuel Weil is treasurer and Fred Ettelson, secretary.

Christensen-Davis Motor Car Co. has been organized to take over the distribution of the H. C. S. car in all of northern California. Headquarters of the new corporation have been established in San Francisco, and it is distributing the Stutz product. Harold Christensen and George A. Davis, the members of the new firm, have been connected for some years with Latham, Davis & Co., Inc., San Francisco and Oakland.

addition to agreeing to close Sundays, the filling station proprietors and tire dealers and service station managers will close shop nightly at 8 o'clock, beginning Nov. 16.

In support of their action and with a view to educating the motorists to obtain their tires, gas and service during the week, the proprietors are conducting an advertising campaign. It was said if the plan worked out during the winter months, the proprietors of these lines will probably keep their places closed Sundays and at nights during the summer months.

### WRECKER MAKES REPORT

Everett, Wash., Nov. 11—Whisky and speeding were responsible for 80 per cent of the 997 wrecks W. F. Healy of this city has pulled in from three counties in three years. The greater number of accidents happen on country roads, where it is easy, at high speed, to get off the narrow strip of pavement, says Healy. Seven out of ten drivers, Healy declares, have headlights brighter than the law permits, and this is responsible for much trouble.

## Shortening Sales Reflected in Medium Priced Factories

### Schedules Are Reduced and Production Enters Upon Greatly Curtailed Winter Basis

DETROIT, Nov. 12—Reductions in manufacturing schedules at factories manufacturing medium priced cars indicate a gradual shortening of sales and a disinclination on the part of dealers to stock heavily against winter and early spring demand. Although there are exceptions, most factories are already operating considerably under the October schedule and still further curtailments will be made.

Dodge Brothers, which has been operating on a 550 a day schedule since spring, will go upon a 400 a day schedule Thursday, Nov. 10.

Buick has reduced operations to a three-day week basis, and Studebaker is also considerably below October marks.

Hupmobile is working upon a 10-car a day schedule.

Ford is continuing on the five-day week at the Highland Park plant, with a schedule approximating 85,000 cars set for November, but it is declared that the schedule is a flexible one and susceptible to sudden change, dependent on the market.

New models, new prices and other conditions are keeping most other factories on a strong production basis.

Maxwell, Chalmers, Oakland, Hudson, Essex, Packard, Cadillac, Chevrolet and Briscoe may be included as benefiting by these sales inducements. Maxwell is conspicuous in this list, the new models having created something bordering upon a furore in motor car circles.

### DEALERS HEAR CHAMBERLAIN

Hartford, Conn., Nov. 11—Hartford automobile dealers crowded Unity Hall four nights last week to listen to P. E. Chamberlain, who lectured to them on subjects of interest to dealers, sales and service men. Interest centered in the used car problem, the word have been passed around among the dealers that the speaker was going to show them just how to handle the used car situation. A number of bankers were present when the used car subject was touched upon, and the remark made by the speaker to the effect that perhaps the bankers had been too good to the dealers did not set very well. The lectures were given under the auspices of the Hartford Automobile Dealers' Assn.

### S. A. E. SECTION MEETS

Minneapolis, Nov. 11—A dinner meeting of the Minneapolis section of the Society of Automotive Engineers was held Nov. 2 in the Manufacturers' Club. Speakers were Professor A. F. Meyer, on "Rotative Balance"; A. H. Bates, on "Engine to Ground Power Absorption in Tractors"; F. E. Kenaston, on "The Relation of the Banker to Industry."

## Golden Gate Enclosed Car Week Strong Sales Force

**Dealers Learn Value of Well Displayed Cars—Annual Show to Profit Through Experience**

SAN FRANCISCO, Nov. 11—With 35 firms participating and 55 different makes of cars on exhibition in the finely decorated showrooms, San Francisco's Enclosed Car Week opened on Monday, Nov. 7. Van Ness avenue and the other streets devoted largely to the automobile dealers presented the appearance of a huge automobile show, made up of nearly two-score smaller shows, each staged behind the plate glass windows of a dealer.

The dealers kept their showrooms open every evening all week until at least 11 p. m., some of them later, so as to give all those unable to attend during the day an opportunity to see the sedans, broughams and coupes of virtually every car sold in San Francisco, or distributed to dealers from this city.

People who went to the various exhibits with the idea that an enclosed car is suitable only for bad weather came away with the thought that it is the ideal car for all kinds of weather—exactly the belief the dealers wished to instill by means of the exhibition.

The whole affair had the most enthusiastic endorsement and support of the San Francisco Motor Car Dealers' Assn. and of all the dealers in the city, and the entire space in almost every showroom of any size in San Francisco was devoted entirely to enclosed cars for the week. Unlike the exhibits at most automobile shows, these cars were in such a position and so lighted that they could be seen in every detail and studied thoroughly by prospective buyers. This had one good effect, in that on the second day of the enclosed car week the dealers were talking about having more open exhibits, fewer cars, better shown, at the next automobile show in February, for which plans are now being prepared and which will be held in the huge civic auditorium.

### ATLANTA BUICK HOUSE ORGAN

Atlanta, Ga., Nov. 11—A semi-monthly house organ will be issued by the Atlanta branch of the Buick Motor Co. beginning in mid-November, for distribution to all Buick dealers and their salesmen in the territory covered by the branch—Georgia, Alabama, Florida and part of South Carolina and Tennessee. There are about 200 Buick dealers in this territory. The publication will be devoted entirely to salesmanship articles, advertising and merchandising, service and kindred lines.

### ISSUES NEW DEALER TAGS

Columbus, O., Nov. 14—Secretary of State Smith has devised a plan which he believes will break up the practice of abusing the dealers' and manufacturers' tags. The new design for the dealers' and manufacturers' tags, to be issued for

1922, contains the letter "D" as well as the numerals.

A dealer is permitted to secure unlimited duplications of the tags and thus the the room for abuse. Now the tags will contain letters starting from "A" and different for each set that is issued to a particular dealer or manufacturer. In that way each tag can be followed and, if used wrongfully, a check can be made. A dealer asking for six sets of tags gets them marked from "A" to "E" and so on. It is figured that no dealer will desire more than are covered by all of the letters of the alphabet.

## G. M. C. Tells of Itself in Booklet of Essential Facts

NEW YORK, Nov. 15—An interesting folder setting forth all the essential facts in reference to the various motor vehicles made by the General Motors Corp. is contained in a circular which is being mailed to stockholders with their dividend checks. The information includes the number of cylinders, wheelbase, weight and factory prices of all the models in the various lines, together with the location of factories and distributors. A summary of prices of touring cars shows Chevrolet at \$525 and \$975; Buick at \$975 and \$1525; Oakland at \$1145; Oldsmobile at \$1145, \$1625 and \$1735; Cadillac at \$3790. It is significant that Scripps-Booth is not mentioned in the circular.

A letter addressed to the stockholders by President du Pont states that one out of every six motor vehicles in use in the United States is a General Motors product. He points out that "members of the immediate family share in the profits from every sale."

"Employees and stockholders are potential missionaries for General Motors; the institution and users of General Motors cars are word-of-mouth advertisers of the products General Motors sponsors," says duPont. "If each of the employees and stockholders would interest himself to the extent of helping to convert but one new buyer a year, sales would be 33 per cent greater and profits accordingly larger."

### SENATE FOR GOOD ROADS

Washington, D. C., Nov. 14—The Senate has adopted the conference report on the good roads bill. The bill carries an appropriation of \$75,000,000, of which \$25,000,000 is immediately available. This money is for the purpose of extending federal aid to the states in road-building. The bill now goes to the President.

## June Only Month to Show Accessory Sales Decrease

**Slight Increases Mark Slow Upward Trend of Generally Improving Business Conditions**

NEW YORK, Nov. 15—The volume of business done by members of the Motor and Accessory Manufacturers' Association for September showed a slight gain over August. This marked the seventh consecutive month in which total sales showed slight variation. It is significant, however, that June was the only month to show a decrease as compared with the preceding month. Another striking fact shown in the report is that there was a change of only .22 per cent in the volume of past due accounts in September. For the first time since March there was a slight increase in the total volume of notes outstanding. The figures for each month this year will be found in the accompanying table.

### GOODRICH PREPARES FOR 1922

Akron, Nov. 15—The B. F. Goodrich Co. has successfully completed the year of preferred dividend payments. The directors' meeting at Akron, Oct. 26, provided for the preferred dividend of \$1.75 a share, payable on Jan. 2, to stockholders of record Dec. 22.

The company has recently increased production to approximately 9,000 tires a day, after having sold two tires for each one manufactured during the past year.

The entire organization has been placed in readiness for the expected increase in business early in the new year. Approximately 500 men were put to work immediately after inventory taking, and this number will probably be gradually increased with the new year.

### WILLYS DEALERS MEET

Charlotte, N. C., Nov. 12—A conference of Overland and Willys-Knight motor car dealers in this territory was held Nov. 1 at the offices of the Dail-Overland Co. here. W. L. Colt of New York City, eastern division sales manager of the Willys-Overland Co., and E. N. Culver, assistant general manager, addressed the meeting.

### WETMORE TRACTOR DROPS

Sioux City, Ia., Nov. 14—The Wetmore Tractor Mfg. Co. has reduced the price of its 12-25 hp. tractor from \$1650 to \$1585.

### SLOW CHANGES SHOW BETTER BUSINESS

| Month—    | Total Purchases | Per Cent Change | Total Past Due | Per Cent Change | Total Notes Outstanding | Per Cent Change |
|-----------|-----------------|-----------------|----------------|-----------------|-------------------------|-----------------|
| January   | \$6,264,587     |                 | \$8,099,727    |                 | \$4,359,871             |                 |
| February  | 10,408,962      | 66.15 Inc.      | 6,717,165      | 17.07 Dec.      | 6,063,118               | 39.08 Inc.      |
| March     | 20,120,386      | 93.30 Inc.      | 5,603,992      | 16.57 Dec.      | 5,069,877               | 16.38 Dec.      |
| April     | 26,746,580      | 32.93 Inc.      | 5,352,271      | 4.49 Dec.       | 5,371,086               | 5.94 Inc.       |
| May       | 26,781,350      | .13 Inc.        | 4,505,176      | 15.64 Inc.      | 4,460,355               | 16.77 Dec.      |
| June      | 22,703,414      | 15.19 Dec.      | 4,720,973      | 4.79 Inc.       | 4,012,670               | 10.37 Dec.      |
| July      | 23,096,214      | 1.68 Inc.       | 5,242,046      | 10.79 Inc.      | 3,690,154               | 7.90 Dec.       |
| August    | 23,397,640      | 1.31 Inc.       | 4,348,790      | 17.06 Dec.      | 3,494,510               | 5.30 Dec.       |
| September | 23,141,891      | 1.09 Inc.       | 4,358,545      | 00.22 Inc.      | 3,677,500               | 5.24 Inc.       |



## Buick Sales Contest Shows Grass Under Dealers' Feet

Official Report Says Too Much  
Attention Is Given to  
Gloomy Ideas

ATLANTA, Ga., Nov. 12—Results of a sales contest conducted in the south-east by the Atlanta branch of the Buick Motor Co. during August, September and October were announced Nov. 8 by Benjamin F. Ulmer, assistant manager of the branch, gross sales of 1170 Buicks being shown in this territory over the period. The contest was for retail salesmen only, not including proprietors, sales managers or managers.

"First and second prizes were won by Frank Pape, with a record of 31 sales, and Craig Perkins, with a record of 20 sales, both of the Birmingham Motor Co. of Birmingham, Ala. J. B. Friday, of the W. T. Smith Co. of Charleston, S. C., and H. M. Garmany, of the Georgia Auto & Supply Co. of Savannah, Ga., were tied for third place with 14 sales each.

Of the 262 men tabulated, 30 averaged sales of 4.51 cars per month, while 232 averaged 0.68 per month. The average sales for the entire 262 is 1.4 per month, or 4.11 over the three-months period.

Commenting upon the results of the contest the Buick bulletin stated: "We believe that the whole story in a nutshell is that the retail men are letting grass grow under their feet and sitting around absorbing too many ideas regarding sales resistance. The function of a salesman is to combat the word NO; it is his business to go out and see more people each day, be more convincing in his arguments and more persistent in his sales effort during a period when demand is low than probably would be necessary if the demand was flourishing."

### ARMY SELLS EQUIPMENT

Atlanta, Ga., Nov. 12—Automobiles and motor trucks of an original value of perhaps \$200,000 were sold at public auction at Camp Jesup, near Atlanta, Nov. 8, all sales being made to the highest bidders regardless of the price. Most of the equipment was reported to be in comparatively poor condition because of the ravages of weather, but considerable of it was still in working order and was sold at ridiculously low prices. Buyers were present from all over the southeast, including a number of dealers. The sale included 116 White motor trucks, several Packard trucks and a number of touring cars.

### ENJOINS PISTON MANUFACTURE

New York, Nov. 14—An order for preliminary injunction has been granted by Federal Judge Learned Hand in the federal court for the southern district of New York to G. E. Franquist, owner of Patent No. 1,153,902, restraining Walker M. Levett Co. of New York from manufacturing and selling pistons alleged to infringe the patent in question. The re-

straining order was broadly effective on that date, but suspended until Jan. 1, 1922, in the case of pistons undelivered on one particular contract.

Franquist's invention makes provision for a smoothly fitting piston skirt at all temperatures. The skirt is slit in such a manner as to fit when cold and to be compressible under uneven expansion of piston and cylinder.

## Farm Products Legal Tender With Georgia Ford Dealers

Atlanta, Ga., Nov. 14—A cooperative crop marketing plan to assist Georgia farmers in disposing of this year's crops was launched by the Atlanta branch of the Ford Motor Co. at a meeting here, Nov. 6, of the district salesmen. Under this plan authorized Ford dealers throughout the state will either purchase diversified products from the farmers direct or sponsor the organization of buying crops for this purpose in their respective communities, with the cooperation of the state bureau of markets.

In addition to this plan, all dealers have been authorized to accept as payment for automobile parts and accessories at current market prices any diversified farm products.

### TRACTOR COMPANY RECEIVER

Indianapolis, Nov. 11—Upon application of John W. Lambert, one of the principal stockholders and creditors of the Buckeye Mfg. Co. of Anderson, Judge Ellis of the Madison county superior court has appointed Linfield Meyers, president of the Marion County Trust Co., receiver of the Buckeye Mfg. Co. The plaintiff said that the liabilities will approximate \$175,000, with assets of real estate, factory and accounts in excess of of this amount. The present condition of the tractor market is said to be the cause of the receivership. The company originally manufactured automobiles.

## "Bull Pen" Idea Sells Used Cars to Birmingham Folk

Dealers Unite in Novel Plan to  
Attract Attention to  
Trade-in Stocks

BIRMINGHAM, Ala., Nov. 11—A novel plan for selling used cars was devised by Birmingham automobile dealers and put into action recently during the semi-centennial celebration. A block was roped off adjacent to the fashion tent and automobile show, and this block was divided into two equal parts, or rather pens, and into each of these pens the dealers would drive the cars which they wished to sell.

One pen was called A and the other B. The prices in each pen varied from day to day, but every car in the pens brought the same price for the day. For instance, the first day the cars in the Class A pen brought \$300 and the cars in the Class B pen brought \$1000.

The plan met the hearty approval of all the local dealers. There were 10 salesmen each day appointed by the 10 dealers participating and one general manager appointed with the consent of dealers. Five salesmen were allotted to each "bull pen" while the general manager was overseer of all sales.

The competition was keen among the dealers and each strove to put the best values in the pen each day. The visitors and prospective buyers were free to enter the pen and choose the best car of the lot.

The idea struck a popular chord in the public's fancy and many sales were made during the week. All of the dealers taking part are elated over the success of the plan, and it is planned to have the occasion repeated when other big celebrations take place within the city.

## Arch Emphasizes New York Enclosed Car Show

This arch, which is about 20 feet wide and the same height, was part of the decoration and publicity of the New York Enclosed Car Show, Nov. 14-19, and could be seen from a long distance up and down Broadway. It had swinging from beneath it a large dead white arrow which at night was a solid mass of electric light bulbs and pointed directly at the Twelfth Regiment Armory, where the show was held, which was but 200 feet away.



# The Readers' Clearing House

## Questions & Answers

### CHARGING FORD MAGNETO WITH 32-VOLT CURRENT

Q—In the issue of Feb. 17, in the Readers' Clearing House, you published a diagram showing apparatus and method of charging Ford magneto from a 110-volt direct current circuit. Can the salt water rheostat, as shown, be used with a 32-volt D. C. circuit by changing the solution of salt water or by changing the dimension and distances of the plates?—W. E. Scott, Claude, Tex.

It will not be necessary to use any sort of resistance with the lower voltage. As it is doubtful that a generator of this voltage will have great enough capacity for the job, it is recommended that the current be taken from the batteries which are usually used with such plants. You may use the full 32-volt pressure from 16 cells, or you may use only 24 volts from 12 cells. The last is preferable. No. 4 or No. 2 starting cable of as short lengths as possible should be used.

It will be best to remove the magneto connection from the top of the transmission cover and insert the wire, pressing it firmly against the magneto disk terminal. The contacts should be as nearly instantaneous as it is possible to make them by striking the free end of the wire rapidly on the metal of the transmission cover. Six to ten contacts should be sufficient.

The best results are obtained by charging the magnets in four different positions. By this is meant that after they have been charged in one position the engine should be given an exact quarter turn and the current applied again, and so on until the magnets have been moved to the four different positions. The reason for this is that sometimes some of the coils are partially short-circuited and do not develop the magnetism necessary for complete charging.

### ILLUSIVE KNOCKS IN BUICK AND JORDAN ENGINES

Q—A 1917 Buick had a knock at 25 m.p.h., and any speed above. Below this speed it ran perfectly, without a sound. At high speeds it sounded as though the engine were going to pound to pieces. We are familiar with burned-out bearing knocks and this is the sort of sound this Buick engine seemed to have. We took up on the main bearings and connecting rods, ran the engine with the crankcase off for a couple of minutes and felt the bearings, which were warm, showing that they were a snug fit. Other things that we looked at without tearing the engine out of the frame were connecting rod and piston alignment, wristpins, piston and cylinder wall clearances, timing gears and valve cages. If we had torn the engine down we are sure that we would have found the trouble. We took this up with

### The Readers' Clearing House

*THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.*

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of *MOTOR AGE* is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. *MOTOR AGE* reserves the right to answer the query by personal letter or through these columns.

Emergency inquiries will be replied to by letter or telegram.

Addresses of business firms will not be published in this department, but will be supplied by letter.

a good many experienced mechanics and here are some of the opinions we got: crankshaft whipping; main bearings (upper) a poor fit; timing gears; crankshaft sprung.

2—We know of another Buick that knocks when the engine is cold. The knock is similar to a connecting rod knock. It persists for about a half a minute while the engine is warming up, after which it disappears.

3—A Jordan car, at speeds above 25 m.p.h., has a knock similar to a connecting rod knock. We took up on the rods and the knock went away for a couple of days but came back later.

4—Publish the piston clearances for the popular makes of cars and the kind of pistons used in them.—F. R., Cleveland, O.

1—Your description of this knock suggests three things to us. Although you say that you aligned the connecting rods, we cannot imagine how you did it without removing the pistons or dismantling the engine. It is also quite possible that though the connecting rod bearings warmed up when you ran the engine with the crankcase removed, possibly one of them is bearing only on one side. This would account for the heating and also

for the fact that the knock persists. Perhaps the most plausible explanation is that there is end motion in the crankshaft. This condition, as well as a sprung rod, usually manifests itself at speeds of 18 m.p.h., or over.

2—We believe that in this case one of the pistons is slightly undersize. If such is the case, it will knock when cold and quiet down as it heats and expands.

3—This is either a case of a floating crankshaft—one having end motion—or a sprung one. We incline to the latter belief, for the reason that taking up the connecting rod bearings eliminated the knock for a few days.

4—This table was published in the Sept. 15 issue of *MOTOR AGE*. It will be found on page 15. A misprint in this table gives the Lycoming engine as having a .0065 in. clearance. This is an error which was corrected in a later issue. The proper figure is .0035 in.

### MAKING A CHEVROLET FAST ROYAL-MAIL

Q—We have a Chevrolet model H-2½, 1916 Royal-Mail in which the engine and other working parts are in good condition. We are figuring on converting the machine into a speedster (not a racing car). It is equipped with Connecticut ignition, electric Auto-Lite generator and starter, but the wiring is all mixed up. Therefore, supply us with the following:

- 1—Complete wiring diagram.
- 2—Clearance between the rocker arms and the valve stems.
- 3—Firing order.
- 4—Is it advisable to have cylinders re-bored and new pistons and rings installed, if the present condition of both are fairly good?
- 5—Would you advise installing larger valves?
- 6—Give proper timing.
- 7—Where can magneto parts be procured?
- 8—Excessive speed is not exactly what is desired, but simply a smooth running speedster capable of 50 or 60 m.p.h. Do you think it possible with the foregoing equipment and a Zenith carburetor?—Clayton Jones, Atlanta, Ga.

1—See Fig. 1.

2—The clearance given by Chevrolet

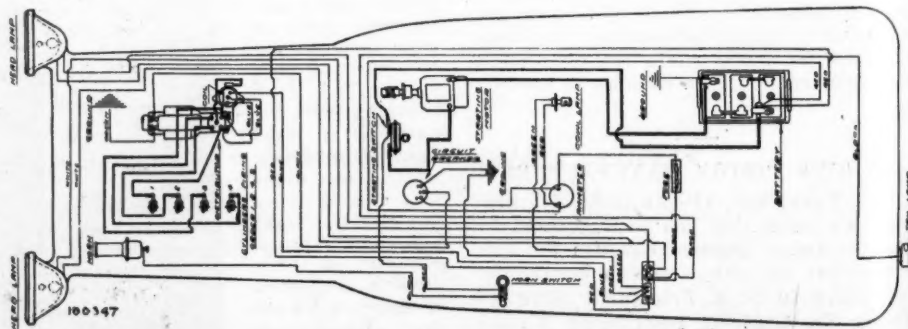


Fig. 1—Diagram of the external wiring plan of the Chevrolet, 1916, H 2½ Royal Mail. Apparatus: Generator, cranking motor and cutout, Auto-Lite, Ignition, Connecticut



Motor Co. is .002 in. for both the inlet and exhaust. We consider this a very close setting and recommend that, if it be used, the engine be very hot when the adjustment is made.

3—Firing order, 1-2-4-3.

4—This is hard to answer. Fair condition might mean anything from perfect to questionable. If the engine has good compression, no piston slaps and does not pump oil, we should recommend that reboring and new pistons be not resorted to for the present.

5—Larger valves can be installed with benefit. We are not certain how much stock can be removed, but recommend that not over 1/32 in. be taken off all around. This will give a 1/16 in. larger valve and the acceleration and speed will be quite noticeable.

6—Timing: intake opens 16 degs. past top dead center and closes 52 degs. past bottom dead center; exhaust opens 40 degs. before bottom dead center and closes 6 degs. past top dead center.

7—Due to the fact that you mention Connecticut ignition in your first paragraph, and that some of the Chevrolets were equipped with Simms magnetos, this question is confusing. If the Connecticut igniter parts are required, they may be procured from any Chevrolet dealer, the Chevrolet Motor Co., Flint, Mich., or the Connecticut Telephone & Electric Co., Meriden, Conn. If the Simms magneto is meant, the parts can be procured from the Simms Magneto Co., East Orange, N. J.

8—There are three ways in which you can attain approximately the speed desired. The first is the simplest and cheapest, and consists of raising the gear ratio to 3.5 to 1. Assuming an engine speed of 2000 r.p.m., this will give you an approximate speed of 52 m.p.h. The second method, which is more expensive, is to increase the engine speed to about 2400 r.p.m. This would call for much larger valves and a lightening of the pistons and the connecting rods. On the whole, the undertaking would be somewhat expensive and result in a speed of about 55 m.p.h. at the present gear ratio. The third plan is a combination of the two foregoing, and contemplates raising the engine speed to 2200. If this can be accomplished, a gear ratio of 3.5 to 1 will give a speed of 57 m.p.h.

#### LIVE WIRES DETECTED BY SIMPLE METHOD

A common pocket compass affords a ready, simple means of determining whether or not current is flowing through a wire. Move the car to a position where the wire is pointing north and south, and bring the compass close to it from above or below. If the wire is carrying current, the compass needle will be deflected to right or left.

This test shows to best advantage in checking exposed headlamp wires. However, it can be used to examine the wires running along the chassis, although in this case it is not so sensitive, as the steel of the frame upsets the compass indications and causes them to be erratic. When conducting the test in the proximity of iron or steel, bring the compass close to the wire and have another

person snap the switch on and off. Any movement of the compass needle, no matter how slight, indicates that current is passing through the conductor.

#### WANTS TO BECOME A RACING DRIVER

Q—Can a cyclecar with a Harley-Davidson Big Twin engine, three-speed gearshift, same sprockets and a chain from the jackshaft to gear box, 72 in. wheelbase, 44 in. tread, 28 by 3 in. wheels and a light body made of 4 by 1 1/2 in. yellow pine make over 70 m.p.h.?

2—Would a body with 28 in. wide seat accommodate two persons?

3—How can one go about it to get into the automobile racing; that is, on the big tracks, Indianapolis and the like?—Emil V. Block, 99 Maple avenue, Hartford, Conn.

1—There are so many factors entering

into a problem of this sort that it is impossible to state definitely what speed could be attained. We believe 70 m.p.h. to be a high estimate.

2—This would depend largely upon the size of the passengers. A 28 in. seat should not crowd unduly.

3—As in any other profession, you will have to start from the "ground up." The professional racing drivers have proven their fitness by a long apprenticeship in a "school of hard knocks." Your best chance will be to enter the sport through dirt track racing. There are several dirt track racing teams, and we have no doubt that if you will communicate with their managers you will receive your chance.

## MYSTERY TALES

### MYSTERY TALE 107

#### Phantom Spark Plugs Glow in Dark

IF we had not seen them we would have been inclined to believe the car owner had been evading the Volstead Act. But "seeing is believing," so here is the story:

The owner had been persuaded to try some XX spark plugs. They seemed to fire all right but, whether he imagined it or not, the engine did not seem to have its usual power. He noticed nothing unusual about them until one dark night he had occasion to raise the hood while the engine was running. What was his surprise when he saw each plug glow with a ghostly, phosphorescent light as the current passed through it. Being curious, he had one of the plugs tested at an electrical laboratory.

What was the result?

Mystery Tales are intended to stimulate thought and imagination. Help some other fellow develop the imagination by sending in a first-class Mystery Tale.

#### The Engine That Fired on Two

Referring to the mystery tale in the October 13 issue of *MOTOR AGE*: I have had a lot of trouble along this line. It is very hard to get mechanics who take interest enough in their work to inspect each part before it is put on the engine. Sometimes the intake manifold is left lying around on the work bench or the floor and a small piece of waste gets into it and works down past the bend where it is unnoticed. Of course, when the manifold is put on the engine the gas passage is blocked off.—Geo. Bunkley, Oil City, La.

We were confident that this Mystery Tale would arouse curiosity and draw several solutions. While Mr. Bunkley's is not the one we have in mind, it is a very good one and also serves to emphasize the point that sufficient care is not exercised in the conducting of service maintenance operations. Only one Mystery Tale reader has supplied the correct solution so far. The question will be held open a while longer.

Mr. Bunkley's explanation is illustrated in Fig. 2.

#### MYSTERY TALE

##### Odd Compound Action of Valves

The trouble Mr. A. Jullien, Calgary, Alb., Canada, is having with the Cole Aero-Eight is indeed a mystery. I have been in Cole service for some time and have never had nor heard of any complaint of Cole Eight having no power. In the sand of this territory, I think the Cole has shown a wonderful amount of power. I believe if Mr. Jullien will check his valves, ignition and timing, and see that he has reasonably good fitting pistons and rings, he and also his customers will find the Cole has a surplus of

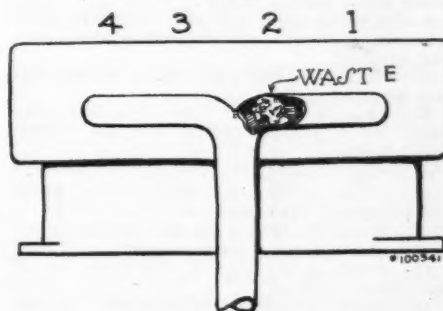


Fig. 2—Waste in the intake manifold. A reader's solution of the Mystery Tale of the Engine That Fired on Two

power. If the peculiar valve action Mr. Jullien speaks of was found in some model previous to the 870 I would say that it was caused by extremely loose timing chains, but as the 870 does not use a chain I will suggest a loose camshaft gear, as these gears are attached to the shaft by three, sometimes four, oval shaped slots. In looking over the Aug. 25 issue of *MOTOR AGE* I find two inquiries on wobbling front wheels. If the steering gear used on these cars is of the worm and gear type, I believe I have an answer to the question. I have had the same trouble and remedied it by taking the end play out of the worm gear shaft.—R. T. Williamson, The Southwest Motor Co., Hutchinson, Kan.

Mr. Williamson's suggestions are both good ones and we believe that the great army of maintenance employees will find them of great value.

### EXHAUST MANIFOLD FOR RACING CAR

Q—Oblige us with your advice in regard to the exhaust manifold for a racing car we are building. We have always understood that the longer the exhaust pipe, within reason, the more advantageous it is. We have also been told that an engine will develop more power with a well-designed exhaust than without any exhaust pipe at all, on account of the atmospheric pressure encountered when no pipe is used. We are enclosing several sketches—Figs. A, B, C, D—and request that you design one or advise which of these will be the most effective in obtaining the most power. The engine we are using is an Essex, which has been rebuilt for speed and turns up approximately 3,200 r.p.m.—J. R. Callum, Norfolk, Va.

Theoretically, a long exhaust pipe which gradually increases in diameter, effects an increase in power, on account of the vacuum effect set up. Your sketch (C) is the best of your designs, but we believe that the one shown at (E) will prove more effective, for the reason that the high speed gases will encounter no sharp corners or other obstacles.

### FORD RACING CAR AND MISCELLANEOUS

Q—We are contemplating building a Ford racing car and would like to ask the following:

- 1—Will a Ford cylinder block stand re-boring to  $3\frac{1}{2}$  or 4 in.?
- 2—Can we increase the stroke to  $4\frac{1}{2}$  or 5 in., by using a special crankshaft?
- 3—Can we remove the camshaft and use an overhead camshaft with special pistons and connecting rods?
- 4—What is the best speed that has been made with a Ford on a half mile track?
- 5—What is the best speed that has been made on a larger track?
- 6—On these cars, had the cylinders been rebored, and, if so, what was the bore and stroke?
- 7—What was the gear ratio, equipment and design?
- 8—What is the best time that has been made by a Dodge racing car on a half mile track?
- 9—What changes were made in the car?
- 10—What is the gear ratio of the Twin Six Packard, 1921 model?
- 11—What is the kerosene mileage per gallon for Stanley steam cars?
- 12—What is the piston displacement of the Essex engine?
- 13—What is the displacement of the Dodge engine?
- 14—Which one develops the most power?
- 15—What would be the piston displacement of an engine  $3\frac{1}{2} \times 5$  in.?
- 16—What was the size of the crankshaft used in the Briscoe car and what size were the bearings?
- 17—Where could we get a crankshaft in the rough with  $2\frac{1}{2}$  in. throws that could be machined so it would use the same size bearings as a Ford engine? We want a shaft like a Ford shaft except with a longer throw.
- 18—Could the old model Hupmobile shaft be worked over so that it could be used for this purpose? We wish to know the foregoing for the reason that our first aim is to increase the stroke of the Ford engine and use a 16 valve over-head camshaft.
- 19—What is the best time for a Hudson racing car?—L. M. Co., Asheville, N. C.

1—A Ford cylinder may be safely bored to a  $\frac{1}{8}$  oversize. This will give a bore of  $3\frac{1}{2}$  in.

2—We strongly recommend that an attempt to lengthen the stroke be abandoned. With the racing equipment contemplated, the car will develop plenty of speed without the contemplated radical

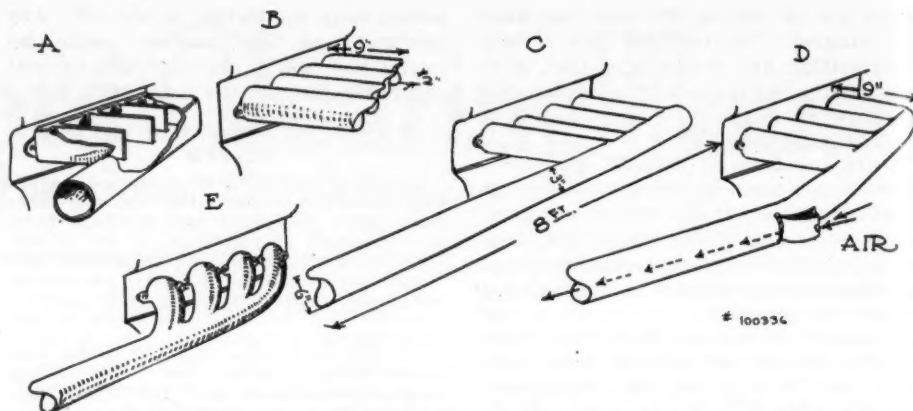


Fig. 3—Suggested exhaust manifolds for racing car. Sharp bends should be avoided, as shown at E.

change. We do not know whether or not there would be enough clearance for the pistons. This can only be determined by measurement.

3—The camshaft can be removed and the special overhead valve head installed.

4—There are no official records. We have had reports of Fords that turned the half mile in 37 and a fraction seconds.

5—See above. We have a report of one Ford with a 16-valve head and light parts which has developed 80 m.p.h.

6—There is no data available on this point.

7—The special equipment was supplied by the Laurel Motors Corp.

8—We have no figures on this.

9—Dodge racing car parts are also supplied by the above mentioned company.

10—4.36 to 1.

11—A kerosene mileage of 12 miles to the gallon is claimed.

12—178.9.

13—212.3.

14—The Essex has an S. A. E. rating of 18.3 hp. and the Dodge 24.03 hp.

15—225.8.

16—We have no information on this point.

17—This information is being supplied by mail direct.

18—We do not know and, as stated in a preceding paragraph, we urge that the change be not attempted.

19—The last official Hudson record was that established by Mulford at Sheephead Bay, May 1 and 2, 1916. This was a 24-hour drive. At the end of the first 12 hours he had averaged 77 m.p.h. flat, having covered 924 miles. A total of 1819 miles was covered in the 24 hours, or at the rate of 76.2 m.p.h. Other Hudson cars have made better time for short distances since the run, but the records are not recognized as official.

### ENGINE BACKFIRES ON LONG UP-GRADE

Q—We have a model 90 Overland, 1918, which has developed a trouble we have been unable to locate. The car will not pull any kind of a long grade without spitting in the carburetor; in fact, its action is the same as if it was out of gasoline. We have cleaned out the vacuum tank, carburetor and gasoline line, tried opening the needle valve more, but with no results at all. The car runs perfectly except when climbing a hill or long grade.

What is your advice in the matter?—Read Brothers' Garage, Baylis, Ill.

We believe this effect to be due to one of two causes: first, and most likely, is that the spark plug gaps are a trifle too wide; second, is that the vacuum feed system is not equal to the demand. On a wide-open throttle, such as is the case when a car is climbing a hill, the demand for fuel is heavy, while the vacuum in the vacuum tank is light, due to the fact that there is very little vacuum in the intake manifold. An easy way to check the matter is to fit up a quart can, as a substitute for the vacuum tank, connecting it directly with the carburetor. If the engine will pull the long grade without backfiring, the trouble will have been located. When making this test, it will be best to disconnect the small pipe between the manifold and vacuum tank and plug the manifold opening.

### WINDINGS OF OVERLAND 4 GENERATOR ARMATURE

Q—We wound an armature from an Overland 4 according to the windings of the old one. When we had finished we noticed one coil too many to connect the commutator segments. Will you explain why there were not 34 segments instead of 33?

2—Two weeks ago I noticed an armature winding diagram of Westinghouse generator, which had 21 slots, 41 segments and one dead coil. What does the dead coil mean?—C. K. Tashima, Golden Belt Garage, Ellis, Kan.

1—You herein encountered the peculiarity of the dead or "dummy" coil. After having wound the 17 slots with two coils per slot, you had 34 coils or 68 ends. As the 33 commutator segments would only accommodate 66 coil ends, you had two coil ends left over. This constituted the dead coil. All that is necessary is to insulate the ends well and tuck them in under the windings, so they cannot come loose. The dead coil is simply added for dynamic balance. The reasons underlying the use of 33 segments instead of 34 have to do with the problems of induction and the neutral plane of the generator. These are too lengthy to be gone into in these columns. We would recommend that you purchase the book, "Practical Armature and Coil Windings," from the U. P. C. Book Co., New York.

2—The above reply also applies to this question.



## WISHES TO CHANGE APPEARANCE OF OLD FRANKLIN CAR

Q—In remodeling a Franklin air-cooled car, of the type with the hood designed on a decided slant, into a speedster or sport model, can we install a hood and radiator similar to water cooled car without danger of spoiling the cooling effect? We intend to leave the lower part of the cooling chamber in, but desire to have a classy looking job similar to the current type of Franklin.

2—We would like to have your idea of how the front should be built; also your idea of how the car would look after completion.—Harry Bragg, 88 Meridian St., Newark, O.

1—The only thing that will require careful watching is that you do not upset the air circulation, as shown in Fig. 4. In all model Franklins, the deck, made of sheet metal and placed just above the lower end of the sleeve over the radiating fans, makes a practically air-tight contact with the hood. Any shape of hood can be used so long as some provision is made to prevent air getting in below the deck.

Two methods that suggest themselves are that the space be filled in with sheet metal or canvass. If the former is used, it will be necessary to rivet it top and bottom, which procedure will sadly interfere with accessibility. If heavy canvass or duck is used, it can be fitted with side curtain eyelets at about 3 in. intervals along the edges. The canvas can be kept in place by means of curtain fasteners riveted to the deck and to the engine splash aprons, called the diaphragm, between the frame and the crankcase.

A third method would be to construct the hood with sheet metal, strips projecting inward, which would lay on top of the deck when the hood is closed. We do not favor this plan so much as the second mentioned, for the reason that the metal would be certain to become sprung or worn, resulting in rattles in a very short time. The camouflage radiator could be made in the form of a shell with the front masked by a section of sheet metal punched with hexagonal holes to give a cellular radiator effect. Any of the radiator or sheet metal manufacturers, who can be found in the advertising section, will be glad to oblige.

2—In a matter of this sort, which is entirely a matter of individuality, we believe it better that the inquirer work out his own ideas. Any sketch which we would supply would air either the side of the two conventional or the ideal. We therefore suggest that you visualize just what you want. The finished creation will then reflect your individuality rather than a composite of your and ours.

## FORD HEADLIGHTS

Q—Publish a diagram showing how dim lights are obtained on the later Ford cars, since the self starter has been put on.

2—How many different styles of switches have been used?

3—What year were the large and small bulbs used in the headlights and how long were they used?

4—Can end play in the Ford crankshaft be taken up successfully without taking the motor down to install new rear bearings? Would adding solder to the ends

of the center bearings suffice?—G. J. Blacett, Lassen, Calif.

1—We have no diagram of the system showing the wiring of the double filament bulb. However, we understand that it is practically the same as that used for the double bulb lamp.

2—Three.

3—They were installed in 1919 and were used up to a short time ago when the double filament bulb was adopted.

4—Makeshift thrust bearings have been put in in the way you suggest. However, the suitability of such an installation is questionable, for the reason that though it takes up end play alright, it does not allow for the longitudinal expansion of the shaft, due to heating, and results in binding.

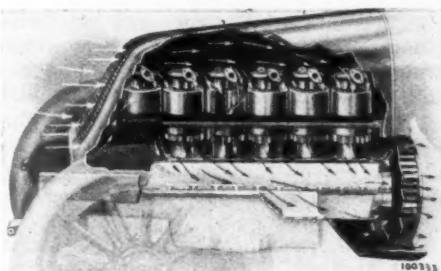


Fig. 4—Cutaway view of Franklin engine shows path of air currents around cylinders for cooling

## ABNORMAL WEAR IN CONNECTING ROD CAPS

Q—Explain just why the caps of connecting rods wear out faster than the upper bearing in the connecting rod end. The cap itself wears out. It seems as though the bearing opposite the cap would wear the quicker as it receives practically all the violence of the explosion.—Herschel Redd, Stanley Automobile Co., New Castle, Ind.

We must confess that this is a new phenomenon to us. The only thing we can suggest is that the rod side of the bearing was more carefully fitted than the cap side when the installation was made. This would account for the excessive wear on the cap.

## LONG AND SHORT SHUNT FIELD WINDINGS

Q—We have a generator armature that was used for automobile work, and would like to know if we can fit it with pole pieces and two brushes and use it as a testing machine on a test stand for both motor and generator. It formerly used three brushes.

2—We are rebuilding a Pullman motor, type P.M.M., and would like to get as much information as possible on it, such as a wiring diagram and valve timing.

3—What is the advantage of long shunt generators and the disadvantage of short shunt machines?—M. L. Haynes, Harrisburg, Pa.

1—Without knowing what make of apparatus the armature was removed from, we cannot advise you intelligently.

2—We are unable to identify this engine from the designation P.M.M. If you can supply us with any more definite identification marks we will be pleased to serve you.

3—The only difference between a short and a long shunt wound generator is that in the former the shunt windings

are connected directly across the brushes and none of the shunt field current passes through the series windings, while in the latter the shunt winding is connected across the generator terminals and all of the shunt field current passes through the series windings. Theoretically in a differentially wound generator the long shunt method should give the best regulation. Actually there is no preference between them.

## ANSTED AND CONTINENTAL POWER PLANTS

Q—Describe the new Ansted and the Continental engines.

2—How do you compare them for power and durability?

3—Do you know if the Durant Motor Co., of Long Island City, intends to use the Ansted engine in all cars manufactured in the future?

4—What engine are they using in their cars on the market at present?—Dr. R. J. Hogan, 5 Center St., Glens Falls, N. Y.

1—The full description of the Ansted engine is too long for these columns. We cannot reply to the second part of this question without knowing to which model Continental you have reference.

2—It is counter to our policy to compare competitive products. The Continental engine needs no recommendation, and so far the Ansted has given a very good account of itself.

3—The six-cylinder Durant cars will be powered with the new Ansted engine and, while we do not know it to be a positive fact, it is very likely that the four-cylinder models will be equipped with Continental built power plants.

4—Continental built.

## CASTOR OIL IN ESSEX ENGINE

Q—Can castor oil be used in an Essex engine?

2—Is a Ford engine considered a high speed engine?—J. E. Messenger, 142 Glenwood Ave., Fullerton, Calif.

1—There is no reason why castor oil cannot be used in an Essex engine if proper precautions are taken. As we have mentioned several times before, castor oil has two bad faults. One is that when it becomes chilled, it precipitates a whitish, crystalline substance which has a tendency to clog up oil passages. The other objectionable feature is that it gums badly. If it is watched for these things and changed frequently, it should give good service.

2—High and low engine speeds are relative terms. Compared to a marine engine a Ford engine is of the high speed type, but compared to such engines as the Essex, the Ansted and racing engines, it is a low speed type. However, it does come within the high speed classification.

## DATA ON 1916 LOZIER

Q—What year was the model 82 Lozier, series 121, engine No. 8774, chassis No. 9243, built?

2—Who builds the engine, or did build it?—O. Morsman, 1151 Central Ave., Memphis, Tenn.

1—This was a 1916 model.

2—The engine was built by the Lozier Co. As you probably know, manufacture has been discontinued.

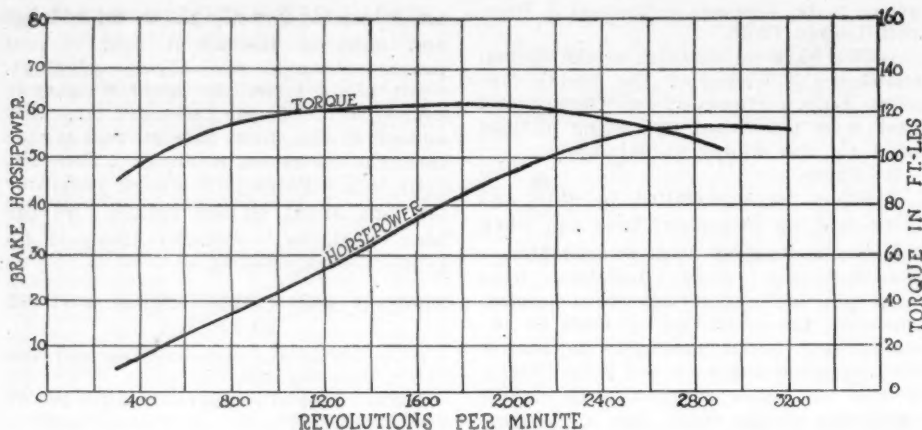


Fig. 5—The above chart shows the hp. and torque curves of the Essex engine

#### HUDSON, ESSEX, CHANDLER, FRONTENAC AND BALLOT ENGINES

Q—What is the S. A. E. rating of the Hudson, Essex, Chandler and LaFayette?

2—Show power curves of Hudson, Essex and LaFayette.

3—Explain the oiling system of Essex and LaFayette engines.

4—How are the ball bearings mounted on the crankshaft of the Frontenac special and Ballot racers?

5—Are the shafts cut in several pieces in order to make this assembly possible? How many bearings are on these shafts?

6—What are the determining factors in securing engine speed?

7—Do valves and their location and size play a more important part than bore and stroke?—R. E. Gibbons, Cleveland, O.

1—Hudson, 29.40 hp.; Essex, 18.3 hp.; Chandler, 27.34 hp.; LaFayette, 33.8 hp.

2—See Figs. 5 and 6. There is no power curve for the LaFayette available.

3—The illustration of the Hudson pump on page 38 of the August 11 issue covers the Essex installation perfectly. Fig. A shows the path of oil through the engine.

This lubrication system can be most suitably termed a circulating constant level splash system. An oil pump is mounted at the front of the engine well above the frame line and in a position where it may be instantly inspected, removed, or tested without recourse to special tools. The pump takes oil from the pressed steel reservoir at the bottom of the engine, drawing all of it through a filter or metal screen of fine mesh. The oil is then fed directly into the front compartment containing the timing gears and their bearings and flows from this into the first oil trough immediately under No. 1 cylinder.

The large splasher on the end of the connecting rod practically empties this oil trough at every revolution, throwing the oil into suitable channels or gutters on the side of the reservoir and crankcase. The upper gutters lead to the main bearings and thus a continuous stream of oil feeds to these. The lower gutter feeds the oil directly into No. 2 trough.

This is illustrated nicely in Fig. 7. The splash from No. 2 oil trough feeds No. 3, and so on until No. 4 trough or the rear end of the engine is reached, at which time the oil goes back into the lower reservoir through an opening. It is, therefore, apparent that all the oil

which enters at the front end must circulate completely through the various troughs and bearings of the engine before it can find an exit at the rear end of the trough, there to re-enter the reservoir. The pump is of the plunger piston type operated by a cam which is driven by a worm gear mounted on the distributor shaft.

You will note from the illustration above that while the oil pump is of conventional type and operated by a plunger bearing cam, its driving mechanism is also connected to the carburetor throttle. This is done to regulate the stroke of the oil pump in proportion to the engine speeds. As the connecting rod dippers splash more oil at the higher speeds than at low speeds, it is necessary to control the stroke of the pump so that the flow is proportionately increased to cope with the more rapid circulation.

While this may sound complicated, it is extremely simple, the action being by means of an eccentric and a very large pump plunger. At low speeds this eccentric holds the plunger away from the cam, but as the engine speeds up, the eccentric is turned by the movement of the throttle, thereby cutting down the distance the plunger is held away from the cam, increasing the action of the plunger accordingly. In this way the pump has a short stroke when the engine is idling at the curb or running slowly, but the minute the throttle is opened wide, the stroke of the pump immediately increases in proportion.

An oil gage is mounted on the dash, which is connected directly to the top of the oil pump. This gage acts simply as an indicator that the oiling system is operating properly. It is not a true indicator of the pounds pressure or the amount of oil delivered, but merely shows that the pump is operating and delivering oil to the engine. Should occasion demand the resetting of the oil plunger in such a manner as to cut down its travel, and it is found that the gage does not register sufficiently, slightly increase the tension of the plunger spring directly over the check valve. Decrease the spring in the event the gage is showing too much pressure. A reading of from two to three pounds under fairly high speeds is correct and

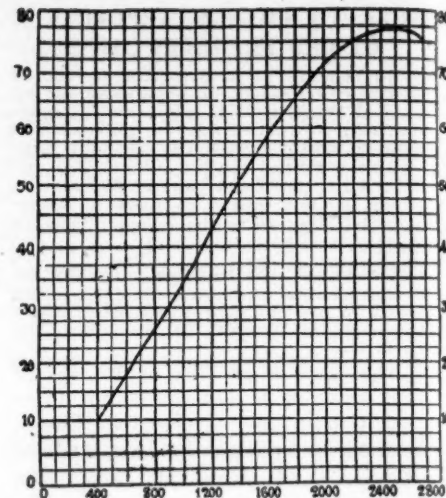


Fig. 6—The dynamometer record of the Hudson engine performance makes a curve like the above

a pound pressure at low speeds is sufficient.

To change the stroke of the oil pump, remove the Plug "A" shown in the illustration in the August 11, issue, start the engine and run it at idling speed. Now insert the end of a match or piece of straight wire in to plug the hole. This will butt up against the top of the oil pump plunger and move in and out with it for the full length of the stroke. Measure its travel. For normal driving this should be about 1/32 in. Where excessive or extreme driving conditions prevail, it should have a travel of about 1/16 in. The setting can be changed by loosening a clamp lever, which can be found directly behind the pump housing assembly. When this has been loosened, insert a screwdriver into the slot at the end of the oil pump regulating shaft and turn the latter slightly over to the right or left.

4—The shaft of the Frontenac is divided in the middle for the center main ball bearings. There are three of these bearings. The Ballot shaft is equipped with five ball bearings and is of the built-up type. This means that it is made in the several parts and then assembled.

6—Weight of reciprocating parts, area of gas openings.

7—Yes. Without changing the bore and stroke of the engine, its speed can be materially increased by increasing the size of the valves. However, in rebuilding, it is customary to increase the bore, sometimes the stroke and to lighten all the reciprocating parts as much as is compatible with safety.

#### REASON FOR CONDENSER IN NORTH EAST GENERATOR

Q—In the Readers' Clearing House section, October 20 issue, you show a North East generator with a condenser. As nearly as we can follow out the windings, the condenser is to protect the cutout.

Do all generators have condensers? If not, do all regulators of that type have condensers?

2—In the Ford generator, which way should the third brush be moved to make it charge more? We should say away from the grounded brush, so as to bring more of the armature coils between the third brush and the grounded brush. We



have reached this conclusion, for the reason that on the Delco-Buick generators the third brush is shifted away from the positive brush and we take it that the third brush on them is negative. Are we right?—E. H. Plummer, Webster, Wis.

1—The condenser used in the North East system is so connected that it forms a shunt with the limiting relay contacts. The limiting relay is the series winding immediately to the right of the cutout proper. As the generator output rises, the limiting relay contacts open and insert a resistance into the shunt field circuit. As the current output is fairly high at the time the points open, some means of protecting them from excessive arcing must be provided. This is the function of the condenser. No, all generators do not have condensers and neither do all relays nor regulators. While not entirely a peculiarity of the North East relay regulator (master relay, as it is called), the use of the condenser for the above mentioned purpose is comparatively rare.

2—Your reasoning is correct. Moving the third brush away from the grounded brush increases the current output, for the reason that more of the active armature coils are brought into the shunt circuit. You are also correct in the case of the Buick. The shunt field current passes from the positive brush through the field windings to the negative third brush. Consequently, moving the third brush away from the positive brush has the effect of increasing the current output.

#### WANTS TO MAKE FORD FAST

Q—We are contemplating speeding up a Ford and would like to have your opinion on a few things. We are going to put on counterbalances and Kant Skore pistons, Flexedge valves and then balance the crankshaft and transmission parts. What we are after is a silent, speedy engine and we want it to run as slow as possible in high. This engine has been rebored to .033 oversize and is in good condition at present. Now what would you advise us to do to get the best results without spending too much money?

1—What would you suggest to increase the compression and what kind of piston rings do you think best to get the best compression?

2—Do you think one Burd high compression and two Burd quick seating rings to a piston would give good results?

3—Do you think that a Strong sight feed oiler would help the engine?

4—Also would a high speed camshaft give very low throttle?

5—I see in Motor Age you recommend lightening the connecting rods on a Buick by drilling the web. Would the same be alright for a Ford with Kant-Skore pistons? If so, what size holes, how many, and how far apart?

6—Where can we get light connecting rods that will work with Dunn counterbalances?

7—Do you think we would get more power and speed with the old style cylinder head or the new style we now have?

8—Can the valve ports be bored out and a larger size valve installed? If so, how much?

9—Would it be necessary to bore out the ports where the manifold fastens on and would a larger intake and exhaust manifold be necessary?

10—About how much would this increase the power?—Earl Shaefer, Adair, Ia.

1—The cylinder head can be planed off about  $\frac{1}{8}$  in. to improve the compression.

We cannot advise you on piston rings. Any good make should give satisfactory results, if correctly fitted.

2—These rings will give good results if the above conditions are complied with.

3—A good sight feed oiler is always insurance against an unexpected failure of lubrication.

4—A high speed camshaft will not give flexibility.

5—Just how many holes can be bored or of what size we are not prepared to say. The largest hole, that at the bottom, must not be nearer than  $1\frac{1}{2}$  in. to the bearing. Considerably more weight can be taken off of the rods by filing away the die marks on the side. One manufacturer of high speed connecting rods makes them only 20 ounces in weight. This is a very low figure and we rather doubt that the stock rod can be reduced to such a limit without seriously weakening it.

6—This query has been replied to by letter.

7—Immaterial. The trick is to raise the compression.

8—The valve seats can be bored out a certain amount. Some of the Ford rebuilders have enlarged them 1-16 in., while others have installed the valves as large as  $1\frac{3}{4}$  in. in diameter.

9—Another rebuilder claims a speed of 67 m. p. h. with the car equipped with the standard gears and 75 to 80 m. p. h. with the  $2\frac{3}{4}$  to 1 gear. He attributes this speed to the installation of  $1\frac{3}{4}$  in. valves and the boring out of the manifold ports to  $\frac{1}{2}$  in.

10—There can be no definite reply to this query as there are many factors other than those which have been mentioned, that enter into power and speed.

The whole subject of Ford rebuilding is one of "cut and try."

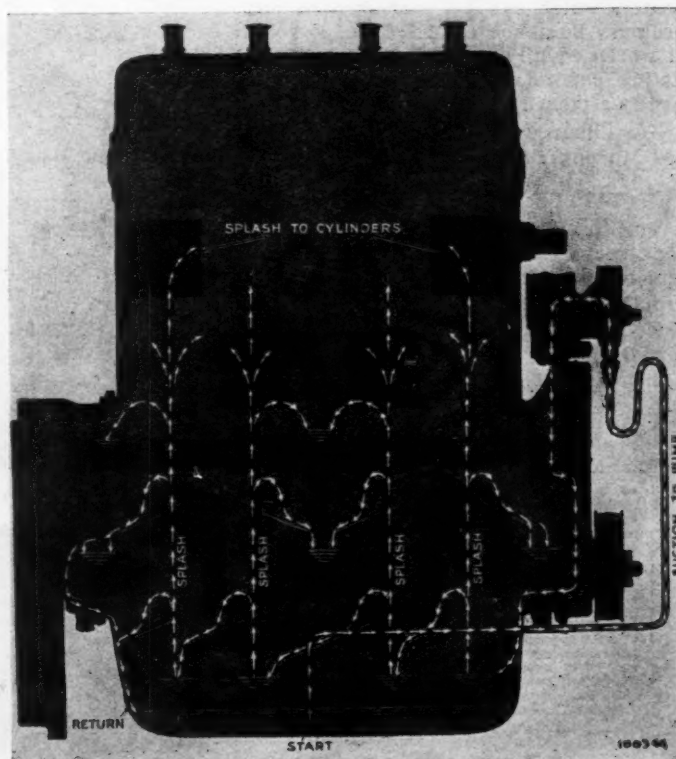
#### ACTUAL HORSEPOWER CANNOT BE CALCULATED

Q—What is the actual horsepower of a six-cylinder engine with a  $4\frac{1}{4}$  in. bore by a  $5\frac{1}{2}$  in. stroke? How is it figured?—Johnson Motor Service Co., Front and Brady Sts., Davenport, Ia.

The only way in which the actual horsepower developed can be determined is by dynamometer test. There have been several formulae proposed for the calculation of horsepower, but so far none has ever been worked out that takes all factors into consideration. For instance, the well known S. A. E., now the N. A. C. C. formula, "diameter square times .7854 times the number of cylinders, divided by 2.5," does not take actual piston speed into consideration, but adopts an arbitrary speed of 1000 per minute and a mean effective pressure of 90 lbs. per sq. inch. By this formula the engine in question would develop 40.84 hp.

A modification of the above formula, adopted by Motor Age some years ago, which takes the piston speed into consideration, is written as follows:  $D^2 \times N \times S \times R$ . Expressed in more easily understood terms this is diameter square times number of cylinders, times piston stroke in inches, times crankshaft revolutions per minute, divided by 15,000. Your problem worked out by this formula is  $4.125 \times 4.125$  equals 17.0156. This figure, multiplied by the number of cylinders, six, equals 102.0936. Multiplied by the stroke, 5.5 in., this yields 561.51480. Assuming an engine speed of 1800 r.p.m. we have 10,107,266. This, divided by 15,000, gives 67.381, or approximately 67.38 hp.

Fig. 7—Diagram showing the path of the cylinder oil through the Essex engine. Each connecting rod almost completely empties its corresponding oil through every revolution, splashing the lubricant into gutters along the inside of the crankcase from whence it flows into the succeeding oil troughs



# The Accessory Show Case

## New Fitments for the Car

### CHANSON CAR HEATER

This flush type floor heater is made of one-piece aluminum casting. The heater casting is so designed that it forms a solid bottom in the pan. The aluminum cover or floor grating is hinged to the heater pan and is held in place by springs. The valve itself is a double butterfly balanced type. The pressure of the exhaust gas against one valve is balanced by the pressure of the right angle valve on the other end of the stem. This being even, allows the valve to set at any angle opening.

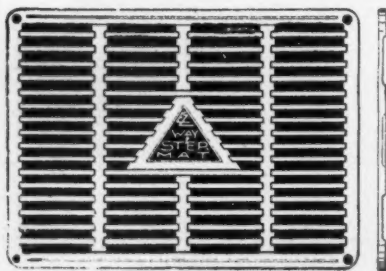
Control is on the instrument board. The heater is furnished with five feet of additional wire and five feet of flexible tubing, so that the valve may be set at the most convenient point on the exhaust pipe. Four feet of tubing is furnished as a tall pipe to carry all exhaust fumes far to the rear of the car. Chanson-Hughson Co., 229 W. Erie St., Chicago.

### SHARPE ELECTRIC RADIATOR HEATER

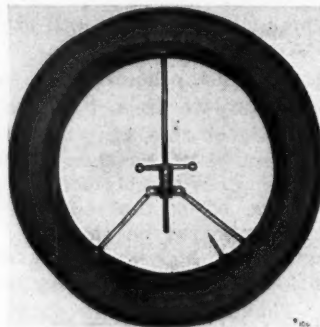
The Sharpe radiator heater is an electrical device which attaches to the bottom of the radiator on the inside, just above the sediment tank. It is connected by heavy duplex cord to a standard attachment plug, which is rigidly clamped to the outside of the radiator shell. It is not necessary to raise the hood. Current is furnished to this attachment plug through the lamp cord supplied with the heater, which can be connected to any ordinary lamp socket of 105 to 120 volts. It works equally well on direct or alternating current. The Sharpe is permanently attached at the radiator base. Price \$9.75. Sharpe Electric Appliance Co., 508 Murphy Bldg., Detroit.

### LITTLE GIANT TIRE TOOL

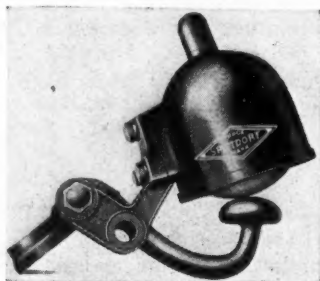
Turning the large wing nut of this tire tool contracts or expands the three arms, which force transmitted to the rim facilitates its removal or replacement. It can be folded into a compact form when not in use. Price \$3.50. C. S. Wilcox, Lansing, Mich.



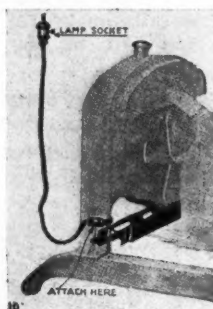
E-Z way step mat



Little Giant tire tool



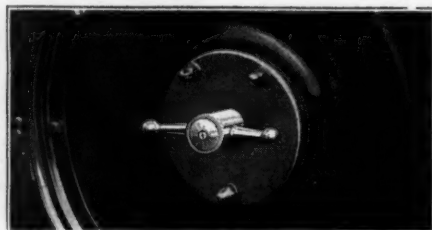
Splitdorf air spring



Sharpe electric radiator heater



Chanson car heater



Oakes wheel lock

### OAKES WHEEL LOCK

The wheel lock consists of three parts: a barrel-shaped lock housing, with two wing arms, which is an aluminum alloy casting reinforced with a hardened steel insert; a combination locking nut and washer, and a removable, non-pickable, dust-proof lock, which fits into the other end of the lock housing. The lock itself is held in place by means of two movable lugs which engage a flange on the inside the lock housing and are controlled by a key turning in a central slot. The device is installed on the stud, which projects through the hub of the spare wheel when mounted on the carrier, and keeps the wheel secure. Price \$7.50. The Oakes Co., Indianapolis.

### SPLITDORF AIR SPRING

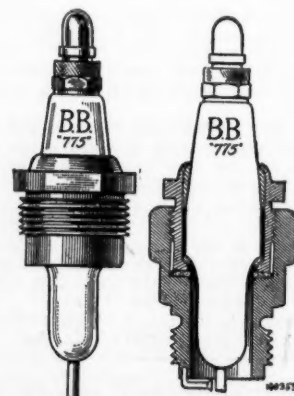
This shock absorber differs from the usual design in that it utilizes the resiliency of a hollow rubber ball, pumped to 20 lbs. air pressure, to absorb jolts of the wheels. The rubber ball is inflated through a valve at the top of the absorber frame in the same manner used in inflating an inner tube. Splitdorf Electrical Co., Newark, N. J.

### B-B TWO-PIECE SPARK PLUGS

The special construction of the B-B plug combines the qualities of the solid non-removable porcelain type with the conventional easily cleaned, two-piece plug. Porcelains are of 775 composition. The illustrations show the special feature. It is manufactured in all sizes by the Brown Bag Filling Machine Co., Fitchburg, Mass.

### E-Z WAY STEP-MAT

This mat is made entirely of aluminum. Horizontal bars on an aluminum frame, reinforced by wide vertical bars, form a grate. Any dirt scraped off falls through to the runningboard, where it may be washed off. Price \$2. G. E. La Vietes Co., New Haven, Conn.



B-B two-piece spark plug

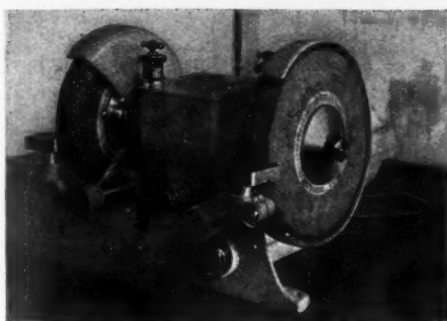


# Service Equipment

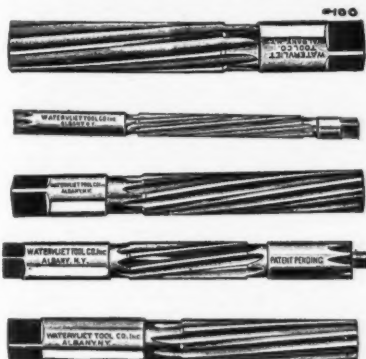
## Time Savers for the Shop

### BLACK & DECKER 8-INCH ELECTRIC BENCH GRINDER

This is a two-wheel bench grinder having a three-quarter hp. motor of the universal type. The motor operates on alternating or direct current. A feature of this new model is the arrangement of the grinding wheels, which are set well forward of the motor casing and arranged so that they overhang the bench. This makes it possible to grind long pieces and odd shapes with facility and also makes it possible to wear the grinding wheels right down to the clamp washers, thus avoiding wastage of wheels. Motor is air-cooled and is arranged so that the air-cooling intake is located 12 in. from the grinding wheels, in order to reduce the possibility of grit being drawn into the machine. The machine is grease lubricated throughout. It is shipped as a complete outfit with two grinding wheels, 8 in. diameter and  $\frac{3}{4}$  in. face, one coarse and one fine; two wheel guards; two adjustable tool rests; electric cable fitted with attachment plug and switch. Price \$120. Black & Decker Mfg. Co., Baltimore, Md.



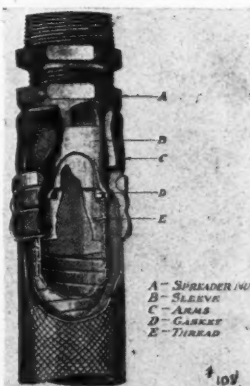
Black &amp; Decker electric bench grinder



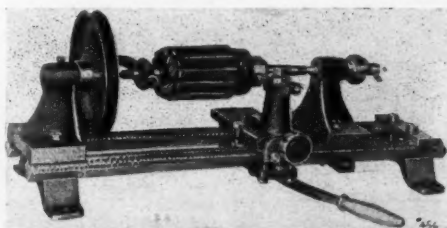
Special reamers for Buicks



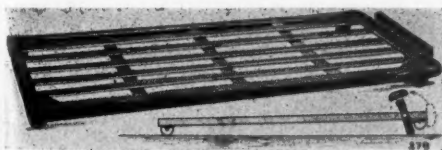
Handy-Dandy Buick valve tool



Knorr detachable gas hose coupling



Onan lathe and mica undercutter



Super-weld creepers

### KNORR DETACHABLE GAS HOSE COUPLING

This is a metal hose coupling readily detachable and applicable to metal-lined gasoline hose. Three or more strong, light arms of stamped steel are made to closely embrace the end of a hose of any given size outside. These arms are held in place by a light steel ring. The steel arms or jaws are made to grip the hose by means of a wedge or spread-nut threaded on the shank of the coupling and forcing out the arms at the other end. From this it will be seen that a powerful compound lever is brought into play—the screw of the wedge nut, the wedge and the lever arm of the jaw, which act on the holding ring as a fulcrum. Barlow Mfg. Co., 108 Park Place, New York.

### SPECIAL LINE OF REAMERS FOR BUICKS

This is a line of special reamers for various parts of the Buick. The king bolt bushing reamer is made long, so both the upper and lower bushings are reamed, thus the entire length is done in one operation. This reamer is also furnished with pilot. Other reamers made by the concern below are the solid piston pin bushing reamer and rocker arm reamer.—Watervliet Tool Co., Inc., Albany, N. Y.

### SUPER-WELD CREEPERS

This creeper is built low. The headrest, when raised, lifts the casters from the floor and anchors the creeper so that it cannot skid around when force is applied to the work. It is painted bright red to be readily seen and to minimize the possibility of its being run over by a car. Welded Products Mfg. Co., Milwaukee.

### AMES DIAL CYLINDER GAGE FOR TESTING

The Ames dial cylinder gage is designed for testing cylinder bores for accuracy and for scores or pits in the walls. The gage, on a handle, is lowered into the cylinder and an indicator on the dial tells its condition. It can be used in all cylinders from 2 $\frac{1}{2}$  in. to 5 in.—B. C. Ames Co., Waltham, Mass.



Ames dial cylinder gage

### ONAN LATHE AND MICA UNDERCUTTER

This is a combination unit, making it possible to true up and turn the commutator of any starter or generator armature. Without removing the armature from the lathe, it is possible to undercut the mica between the bars in an efficient manner. The turning tool is controlled by hand wheel feed screw. The carriage is operated lengthwise by a drop forged handle with suitable adjustment for every commutator. Shipping weight, 35 lbs. Price, \$38. David W. Onan, 43 Royalston Ave., Minneapolis, Minn.

### HANDY-DANDY BUICK VALVE TOOL

This tool is used to facilitate the removal of the valve cage from the Buick engine. To remove push rod, lift the rocker arm with the hook. To lift the valve cage, slip the fork end between the spring coils, placing the heel on the block and using it as a bar. To remove the key, clamp the swinging bracket in the vise, place the cage on the bracket and press the spring down with the bar. A. M. Dellinger, 725 N. Prince street, Lancaster, Pa.

## Specifications of Current Passenger Car Models

| NAME AND MODEL             | Engine Make | Cylinders, Bore and Stroke | WB      | Tires    | 2-Pass. | 5-Pass. | 7-Pass. | Coupe | Sedan | NAME AND MODEL          | Engine Make | Cylinders, Bore and Stroke | WB      | Tires    | 2-Pass.             | 5-Pass. | 7-Pass. | Coupe | Sedan |
|----------------------------|-------------|----------------------------|---------|----------|---------|---------|---------|-------|-------|-------------------------|-------------|----------------------------|---------|----------|---------------------|---------|---------|-------|-------|
| Ambassador.....R           | Cont.       | 6-3 1/2 x 5 1/4            | 136     | 33x5     | 14500   | 14500   | 14500   | 14500 | 14500 | Maxwell.....25          | Own.        | 4-3 1/2 x 4 1/2            | 109     | 31x4     | \$ 885              | \$ 885  | 1385    | 1485  |       |
| American.....C             | H-S.        | 6-3 1/2 x 5                | 127     | 32x4     | 2195    | 2195    | 2195    | 2195  | 2195  | McFarlan.....1921       | Own.        | 6-4 1/2 x 6                | 140     | 33x5     | 6300                | 6300    | 7500    | 7500  |       |
| Anderson.....Series 40     | Cont.       | 6-3 1/2 x 4 1/2            | 120     | 33x4     | 1650    | 1650    | 1650    | 1650  | 1650  | Mercer.....Series 5     | Own.        | 4-3 1/2 x 6 1/2            | 132     | 32x4 1/2 | 3950                | 3950    | 4850    | 5250  |       |
| Apperson.....8-21-S        | Own.        | 8-3 1/2 x 5                | 130     | 34x4 1/2 | 3000    | 3250    | 4500    | 4500  | 4500  | Merit.....R & RR        | Dues.       | 6-3 1/2 x 4 1/2            | 119     | 32x4     | 1985                | 1985    | 2795    | 2895  |       |
| Apperson.....Anniversary   | Own.        | 8-3 1/2 x 5                | 130     | 34x4 1/2 | 3500    | 3750    | 2475    | 2475  | 2475  | Metz.....M6             | Rut.        | 6-3 1/2 x 5                | 120     | 32x4     | 5500                | 5500    | 2795    | 2895  |       |
| Auburn.....6-51            | Cont.       | 6-3 1/2 x 4 1/2            | 121     | 32x4     | 1670    | 1695    | 1760    | 2475  | 2475  | Mitchell.....F-40       | Own.        | 6-3 1/2 x 5                | 120     | 32x4     | 1995                | 1995    | 2795    | 2895  |       |
| Beggs.....20T              | Cont.       | 6-3 1/2 x 4 1/2            | 120     | 33x4     | 1775    | 1520    | 2320    | 2420  | 2420  | Mitchell.....F-40       | Own.        | 6-3 1/2 x 5                | 120     | 32x4     | 1490                | 1490    | 2290    | 2440  |       |
| Bell.....4-32              | H-S.        | 4-3 1/2 x 5                | 114     | 31x4     | 1495    | 1495    | 1495    | 1495  | 1495  | Mitchell.....F-42       | Own.        | 6-3 1/2 x 5                | 120     | 33x4     | 1795                | 1795    | 2290    | 2440  |       |
| Bell.....6-50              | H-S.        | 6-3 1/2 x 5                | 124     | 32x4     | 1695    | 1695    | 1695    | 1695  | 1695  | Mitchell.....F-45       | Own.        | 6-3 1/2 x 5                | 120     | 33x4     | 2000                | 2000    | 2290    | 2440  |       |
| Biddle.....B1 & B5         | Buda.       | 4-3 1/2 x 5 1/2            | 121     | 32x4     | 3475    | 3475    | 3475    | 3475  | 3475  | Moller.....A            | Own.        | 4-2 1/2 x 4                | 100     | 27x3 1/2 | 1285                | 1285    | 1625    | 1725  |       |
| Birch Super-Four.....      | H-S.        | 6-3 1/2 x 5 1/2            | 117     | 33x4     | 1195    | 1195    | 1195    | 1195  | 1195  | Monroe.....S-9 & 10     | Own.        | 4-3 1/2 x 4 1/2            | 115     | 32x3 1/2 | 1285                | 1285    | 1625    | 1725  |       |
| Birch Light Six.....       | Leit.       | 4-3 1/2 x 4 1/2            | 108     | 30x3 1/2 | 995     | 995     | 995     | 995   | 995   | Monroe.....S-11 & 12    | Own.        | 4-3 1/2 x 4 1/2            | 115     | 33x4     | 1785                | 1785    | 2285    | 2785  |       |
| Birch Six.....             | H-S.        | 6-3 1/2 x 5 1/2            | 126     | 33x4 1/2 | 2385    | 2385    | 2385    | 2385  | 2385  | Moon.....6-48           | Cont.       | 6-3 1/2 x 5 1/2            | 122     | 32x4     | 1785                | 1785    | 2285    | 2785  |       |
| Bour-Davis.....91S         | Cont.       | 6-3 1/2 x 5 1/2            | 126     | 33x4 1/2 | 2385    | 2385    | 2385    | 2385  | 2385  | Moon.....6-48           | Cont.       | 6-3 1/2 x 5 1/2            | 122     | 32x4     | 1785                | 1785    | 2285    | 2785  |       |
| Brewster.....21            | Own.        | 4-4 x 5 1/2                | 109     | 31x4     | 935     | 975     | 1475    | 1650  | 1650  | Murray-Mac Six.....     | Own.        | 6-3 1/2 x 5 1/2            | 128     | 34x4 1/2 | 4250                | 4250    | 4250    | 4250  |       |
| Buick.....1922-34-35-36-37 | Own.        | 6-3 1/2 x 4 1/2            | 118     | 33x4 1/2 | 1495    | 1525    | 2135    | 2435  | 2435  | Nash.....681-7          | Own.        | 6-3 1/2 x 5                | 121     | 33x4     | 1525                | 1545    | 1695    | 2395  | 2695  |
| Buick.....1922-44-5-6-7    | Own.        | 6-3 1/2 x 4 1/2            | 124     | 34x4 1/2 | 1735    | 1735    | 2325    | 2635  | 2635  | Nash.....682            | Own.        | 6-3 1/2 x 5                | 127     | 34x4 1/2 | 1695                | 1695    | 2395    | 2695  |       |
| Buick.....1922-48-9-50     | Own.        | 6-3 1/2 x 4 1/2            | 116     | 33x4     | 1195    | 1195    | 1735    | 2325  | 2635  | Nash Four.....41-4      | Own.        | 4-3 1/2 x 5                | 112     | 33x4     | 1025                | 1045    | 1645    | 1835  |       |
| Bush.....E.C.4             | Lyc.        | 4-3 1/2 x 5                | 116     | 33x4     | 1385    | 1385    | 1750    | 1850  | 1850  | National Sextet.....BB  | Own.        | 6-3 1/2 x 5 1/2            | 130     | 32x4 1/2 | 2990                | 2990    | 4140    | 4240  |       |
| Bush.....E.C.6             | Rut.        | 6-3 1/2 x 5                | 116     | 33x4     | 1385    | 1385    | 1750    | 1850  | 1850  | Noma.....1C             | Cont.       | 6-3 1/2 x 4 1/2            | 128     | 32x4 1/2 | 2800                | 2850    | 3200    | 3700  |       |
| Cadillac.....61            | Own.        | 8-3 1/2 x 5 1/2            | 132     | 33x5     | 3790    | 3790    | 4690    | 4950  | 4950  | Norwalk.....430-KS      | Lyc.        | 4-3 1/2 x 5                | 116     | 32x3 1/2 | 1035                | 1035    | 1625    | 1725  |       |
| Caso.....V                 | Cont.       | 6-3 1/2 x 5 1/2            | 126     | 34x4 1/2 | 2250    | 2250    | 2900    | 3285  | 3285  | Oakland.....34-D        | Own.        | 6-2 1/2 x 4 1/2            | 115     | 32x4     | 1095                | 1145    | 1265    | 1625  | 1725  |
| Chalmers.....6-30          | Own.        | 6-3 1/2 x 4 1/2            | 117     | 32x4     | 1245    | 1295    | 1995    | 2295  | 2295  | Ogden.....6-T           | Cont.       | 6-3 1/2 x 5 1/2            | 134     | 33x5     | 4250                | 4250    | 5200    | 5500  |       |
| Chalmers.....6-30          | Own.        | 6-3 1/2 x 4 1/2            | 122     | 33x4 1/2 | 1395    | 1395    | 1995    | 2295  | 2295  | Oldsmobile.....43-A     | Own.        | 4-3 1/2 x 5 1/2            | 115     | 32x4     | 1145                | 1145    | 1645    | 1845  |       |
| Champion.....Tourist       | Lyc.        | 4-3 1/2 x 5                | 113     | 32x4     | 995     | 995     | 1050    | 1050  | 1050  | Oldsmobile.....37-A     | Own.        | 6-2 1/2 x 4 1/2            | 112     | 32x4     | 1450                | 1450    | 2145    | 2145  |       |
| Champion.....Special       | H-S.        | 6-3 1/2 x 5                | 118     | 32x4     | 1295    | 1295    | 1295    | 1295  | 1295  | Oldsmobile.....46       | Own.        | 8-2 1/2 x 4 1/2            | 122     | 33x4 1/2 | 1735                | 1735    | 2635    | 2635  |       |
| Chandler.....Six           | Own.        | 6-3 1/2 x 5                | 123     | 33x4     | 1785    | 1785    | 2785    | 2885  | 2885  | Oldsmobile.....47       | Own.        | 8-2 1/2 x 4 1/2            | 115     | 32x4     | 1625                | 1625    | 2185    | 2425  |       |
| Chevrolet.....490          | Own.        | 4-3 1/2 x 4                | 102     | 30x3 1/2 | 525     | 525     | 875     | 875   | 875   | Overland.....4          | Own.        | 4-3 1/2 x 4                | 100     | 30x3 1/2 | 595                 | 595     | 850     | 895   |       |
| Chevrolet.....FB           | Own.        | 4-3 1/2 x 5 1/2            | 110     | 32x4     | 975     | 975     | 1575    | 1575  | 1575  | Packard.....Single-Six  | Own.        | 6-3 1/2 x 4 1/2            | 116     | 33x4 1/2 | 2350                | 2350    | 3125    | 3350  |       |
| Cleveland.....40           | Own.        | 6-3 1/2 x 5 1/2            | 112     | 32x4     | 1295    | 1295    | 2195    | 2295  | 2295  | Packard.....Twin Six    | Own.        | 12-3 x 5                   | 136     | 35x5     | 4850                | 4850    | 6600    | 6800  |       |
| Climber Four.....K         | H-S.        | 4-3 1/2 x 5                | 115     | 33x4     | 1385    | 1385    | 2195    | 2295  | 2295  | Paige.....6-44          | Own.        | 6-3 1/2 x 5                | 119     | 32x4     | 1635                | 1635    | 2450    | 2570  |       |
| Climber Six.....H-S.       | Own.        | 6-3 1/2 x 5                | 125 1/2 | 32x4 1/2 | 2250    | 2250    | 3000    | 3100  | 3100  | Paige.....6-66          | Cont.       | 6-3 1/2 x 5                | 131     | 33x4 1/2 | 2975                | 3295    | 2875    | 3755  | 3830  |
| Cole.....870               | Nort.       | 8-3 1/2 x 5                | 127     | 33x5     | 2485    | 2485    | 3385    | 3685  | 3685  | Pan American.....6-55   | H-S.        | 6-3 1/2 x 5                | 121     | 33x4     | 2000                | 2000    | 2100    | 2100  |       |
| Columbia Challenger.....   | Cont.       | 6-3 1/2 x 5                | 115     | 32x4     | 1475    | 1475    | 1475    | 2295  | 2350  | Parenti.....1921        | Own.        | 8-2 1/2 x 4 1/2            | 125     | 32x4     | 2000                | 2000    | 3000    | 3000  |       |
| Columbia.....D-C&S         | Cont.       | 6-3 1/2 x 5 1/2            | 125     | 33x4 1/2 | 2350    | 2350    | 2350    | 2350  | 2350  | Paterson.....650        | Cont.       | 6-3 1/2 x 4 1/2            | 120     | 33x4     | 1505                | 1625    | 2605    | 2695  |       |
| Comet.....C-53             | Cont.       | 6-3 1/2 x 5 1/2            | 117     | 32x4     | 1395    | 1395    | 2465    | 2465  | 2465  | Peerless.....56-S-7     | Own.        | 8-3 1/2 x 5                | 125     | 34x4 1/2 | 2880                | 2880    | 3500    | 3790  |       |
| Commonwealth.....44        | H-S.        | 4-3 1/2 x 5                | 117     | 32x4     | 1395    | 1395    | 2465    | 2465  | 2465  | Piedmont.....4-30       | Lyc.        | 4-3 1/2 x 5                | 116     | 32x4 1/2 | 970                 | 970     | 1625    | 1625  |       |
| Crawford.....21-6-10       | Cont.       | 6-3 1/2 x 5 1/2            | 122 1/2 | 32x4     | 3000    | 3000    | 4500    | 4500  | 4500  | Piedmont.....6-40       | Cont.       | 6-3 1/2 x 4 1/2            | 122     | 32x4     | 1285                | 1285    | 1625    | 1625  |       |
| Crow-Elkhart.....163-65    | Lyc.        | 4-3 1/2 x 5                | 117     | 32x3 1/2 | 1285    | 1295    | 2395    | 2395  | 2395  | Pierce-Arrow.....       | Own.        | 6-4 x 5 1/2                | 138     | 33x5     | 7000                | 6500    | 8000    | 8500  |       |
| Crow-Elkhart.....S63-65    | H-S.        | 6-3 1/2 x 5                | 117     | 33x4     | 1545    | 1545    | 2395    | 2395  | 2395  | Pilot.....6-45          | Teetor      | 6-3 1/2 x 5                | 120     | 32x4     | 1945                | 1945    | 2335    | 3350  | 3400  |
| Daniels.....D-19           | Own.        | 8-3 1/2 x 5 1/2            | 132     | 34x4 1/2 | 5350    | 5350    | 6250    | 6950  | 6950  | Pilot.....6-50          | H-S.        | 6-3 1/2 x 5                | 126     | 32x4 1/2 | 2285                | 2285    | 2335    | 3350  | 3400  |
| Davis.....61-67            | Cont.       | 6-3 1/2 x 5 1/2            | 120     | 32x4     | 1895    | 1895    | 2595    | 2595  | 2595  | Porter.....46           | Own.        | 4-4 x 6 1/2                | 142     | 35x5     | 6750                | 6750    | 7800    | 7800  |       |
| Dispatch.....H-S-70        | Wisc.       | 4-3 1/2 x 5                | 112     | 32x4     | 1345    | 1345    | 1995    | 1995  | 1995  | Premier.....6-D         | Own.        | 6-3 1/2 x 5 1/2            | 129     | 33x5     | 3790                | 3690    | 4690    | 5190  |       |
| Dixie Flyer.....H-S-70     | Wisc.       | 4-3 1/2 x 5                | 112     | 32x4     | 1345    | 1345    | 1995    | 1995  | 1995  | Premcar.....6-40 A      | Falls.      | 6-3 1/2 x 4 1/2            | 117     | 32x4     | 1295                | 1295    | 1945    | 1995  |       |
| Dodge Brothers.....        | Own.        | 4-3 1/2 x 4 1/2            | 114     | 32x4     | 935     | 985     | 1785    | 1785  | 1785  | Raleigh.....A-6-60      | H-S.        | 6-3 1/2 x 5                | 122     | 32x4 1/2 | 2250                | 2250    | 3100    | 3200  |       |
| Dorris.....6-80            | Own.        | 6-4 x 5                    | 132     | 33x5     | 4785    | 4785    | 5800    | 6290  | 6290  | R & V Knight.....R      | Own.        | 4-3 1/2 x 5                | 116     | 32x4     | 1500                | 1500    | 2650    | 2750  |       |
| Dort.....17-12             | D-Lyc.      | 4-3 1/2 x 5                | 108     | 31x4     | 985     | 985     | 1535    | 1685  | 1685  | R & V Knight.....J      | Own.        | 6-3 1/2 x 5 1/2            | 127     | 32x4 1/2 | 3350                | 3350    | 4000    | 4200  |       |
| Driggs.....                | Own.        | 4-3 1/2 x 4 1/2            | 104     | 30x3 1/2 | 1275    | 1275    | 1975    | 1975  | 1975  | Ranger 22-A.....A-B-C-D | Own.        | 4-3 1/2 x 5                | 116     | 32x4     | 1485                | 1485    | 2100    | 2250  |       |
| Du Pont.....A              | Own.        | 4-3 1/2 x 4 1/2            | 124     | 32x4 1/2 | 3400    | 3400    | 4900    | 4900  | 4900  | Ranger 22-B.....A-B-C-D | Own.        | 6-3 1/2 x 5                | 123     | 33x4 1/2 | 3550                | 3550    | 4450    | 4850  |       |
| Durant.....A-22            | Own.        | 4-3 1/2 x 4 1/2            | 109     | 31x4     | 890     | 890     | 1365    | 1365  | 1365  | Reo Series A & B T & U  | Own.        | 6-3 1/2 x 5                | 120     | 33x4     | 1650                | 1650    | 1685    | 2700  | 2750  |
| Earl.....4-40              | Own.        | 4-3 1/2 x 5 1/2            | 112     | 32x4     | 1375    | 1285    | 1995    | 1995  | 1995  | Revere.....C            | Dues.       | 4-4 1/2 x 6                | 131     | 32x4 1/2 | 4850                | 4650    | 5450    | 6500  |       |
| Elcar.....K-4              | Lyc.        | 4-3 1/2 x 5                | 117     | 33x4     | 1145    | 1145    | 1545    | 1645  | 1645  | Roamer.....6-54-E       | Own.        | 6-3 1/2 x 5 1/2            | 128     | 32x4 1/2 | 2750                | 2485    | 2750    | 3850  |       |
| Elcar.....7-R              | Own.        | 4-3 1/2 x 5                | 117     | 33x4     | 1195    | 1195    | 2395    | 2495  | 2495  | Roamer.....4-75-E       | Dues.       | 4-4 1/2 x 6                | 128     | 32x4 1/2 | 3850                | 3650    | 4450    | 5450  |       |
| Elgin.....K-1              | Falls.      | 6-3 1/2 x 4 1/2            | 118     | 33x4     | 1595    | 1495    | 2395    | 2395  | 2395  | Rolls-Royce.....        | Own.        | 6-4 1/2 x 4 1/2            | 143 1/2 | 33x5     | U. S. Chassis Price | 11750   | 11750   | 11750 |       |
| Essex.....                 | Own.        | 4-3 1/2 x 5                | 108 1/2 | 32x4     | 1195    | 1195    | 1395    | 1995  | 1995  | Romer.....              | Cont.       | 6-3 1/2 x 4 1/2            | 120     | 33x4     | 2000                | 2000    | 2100    | 2450  | 2750  |
| Fergus.....S-5-21          | Own.        | 6-3 1/2 x 5                | 126     | 33x4 1/2 | 2895    | 2895    | 3695    | 3695  | 3695  | Saxon.....125           | Own.        | 4-3 1/2 x 5                | 112     | 32x4     | 1345                | 1295    | 1995    | 1995  |       |
| Ferris.....C-20            | Cont.       | 6-3 1/2 x 5 1/2            | 130     | 32x4 1/2 | 2895    | 2895    | 3695    | 3695  | 3695  | Sayers Six.....DP       | Cont.       | 6-3 1/2 x 4 1/2            | 118     | 33x4     | 1795                | 1795    | 2695    | 2695  |       |
| Ford.....T                 | Own.        | 4-3 1/2 x 4                | 109     | 30x3 1/2 | 2325    | 2325    | 2650    | 2650  | 2650  | Seneca.....L & O        | LeR.        | 4-3 1/2 x 4 1/2            | 108     | 30x3 1/2 | 1045                | 1045    | 2100    | 2250  |       |
| Franklin.....9-B           | Own.        | 6-3 1/2 x 4                | 115     | 32x4     | 2300    | 2350    | 2650    | 3350  | 3350  | Severin.....Six         | Cont.       | 6-3 1/2 x 5 1/2            | 122 1/2 | 33x5     | 2550                | 2550    | 3250    | 3350  |       |
| Gardner.....T-R & C        | Lyc.        | 4-3 1/2 x 5                | 112     | 32x3 1/2 | 1095    | 1095    | 1695    | 1695  | 1695  | Skelton.....35          | Lyc.        | 4-3 1/2 x 5                | 112     | 32x3 1/2 | 995                 | 995     | 1625    | 1625  |       |
| Grant.....Six              | Own.        | 6-3 1/2 x 4 1/2            | 116     | 32x4     | 1550    | 1550    | 2450    | 2450  | 2450  | Southern Six.....660-2  | H-S.        | 6-3 1/2 x 5                | 127     | 32x4 1/2 | 2375                | 2375    | 2395    | 2395  |       |
| H.C                        |             |                            |         |          |         |         |         |       |       |                         |             |                            |         |          |                     |         |         |       |       |



## Specifications of Current Motor Truck Models

| NAME AND MODEL    | Tons Capacity | Chassis Price | Bore and Stroke | TIRES Front Rear  | Final Drive | NAME AND MODEL   | Tons Capacity | Chassis Price | Bore and Stroke | TIRES Front Rear  | Final Drive | NAME AND MODEL        | Tons Capacity | Chassis Price | Bore and Stroke | TIRES Front Rear  | Final Drive |
|-------------------|---------------|---------------|-----------------|-------------------|-------------|------------------|---------------|---------------|-----------------|-------------------|-------------|-----------------------|---------------|---------------|-----------------|-------------------|-------------|
| Acason            | 3/4           | \$1650        | 3 1/2 x 5       | 34x5 1/2 34x5 1/2 | W           | Corbitt, H       | 3 1/2         | \$1800        | 3 1/2 x 5       | 35x5 1/2 35x5 1/2 | B           | Garford, 77D          | 3 1/2         | \$4300        | 4 1/2 x 6       | 36x5 36x6d        | W           |
| Acason, R         | 1             | 2260          | 3 1/2 x 5 1/2   | 36x3 1/2 36x5     | W           | Corbitt, E       | 1             | 2200          | 3 1/2 x 5       | 34x3 1/2 34x4     | W           | Garford, 68D          | 5             | 5200          | 5 x 6 1/2       | 36x6 40x6d        | W           |
| Acason, RB        | 1 1/2         | 2485          | 3 1/2 x 5 1/2   | 36x3 1/2 36x6     | W           | Corbitt, D       | 1 1/2         | 2600          | 3 1/2 x 5       | 36x3 1/2 36x5     | W           | Garford, 150-A        | 7 1/2         | 5500          | 5 x 6 1/2       | 36x6 40x7d        | W           |
| Acason, H         | 2 1/2         | 3295          | 4 1/2 x 5 1/2   | 36x4 36x8*        | W           | Corbitt, C       | 2             | 3150          | 4 1/2 x 5 1/2   | 36x3 1/2 36x7     | W           | Gary, F               | 1             | 2100          | 3 1/2 x 5       | 36x3 1/2 36x4     | W           |
| Acason, L         | 3 1/2         | 4295          | 4 1/2 x 5 1/2   | 36x5 36x10*       | W           | Corbitt, B       | 2 1/2         | 3300          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Gary, I               | 1 1/2         | 2550          | 4 x 5 1/2       | 36x3 1/2 36x5     | W           |
| Acason, M         | 5             | 5250          | 5 x 6 1/2       | 36x6 40x12        | W           | Corbitt, A       | 3 1/2         | 4100          | 4 1/2 x 5 1/2   | 36x5 36x10        | W           | Gary, J               | 1 1/2         | 3150          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Ace, C            | 1 1/2         | 2295          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5*    | W           | Corbitt, AA      | 5             | 5000          | 4 1/2 x 6       | 36x6 40x6d        | W           | Gary, K               | 2 1/2         | 3450          | 4 1/2 x 6       | 36x5 40x5d        | W           |
| Ace, A            | 3 1/2         | 2795          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Day-Elder, A     | 1             | 1600          | 3 1/2 x 5       | 34x3 1/2 34x4     | W           | Gary, M               | 5             | 5150          | 5 x 6 1/2       | 36x6 40x6d        | W           |
| Acme, G           | 3/4           | ....          | 3 1/2 x 5       | 35x5 1/2 35x5 1/2 | W           | Day-Elder, B     | 1 1/2         | 2000          | 3 1/2 x 5       | 34x3 1/2 34x5     | W           | Gersix, M             | 1 1/2         | 3100          | 4 x 5 1/2       | 36x3 1/2 36x7     | W           |
| Acme, B           | 1             | ....          | 3 1/2 x 5       | 34x3 1/2 34x5     | W           | Day-Elder, C     | 2             | 2400          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Gersix, K             | 2 1/2         | 3500          | 4 1/2 x 5 1/2   | 36x4 36x8         | W           |
| Acme, F           | 1 1/2         | ....          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Day-Elder, D     | 2 1/2         | 2750          | 4 1/2 x 5 1/2   | 36x5 36x7         | W           | Gersix, L             | 3 1/2         | 4500          | 4 1/2 x 6       | 36x5 40x12        | W           |
| Acme, AC          | 2 1/2         | ....          | 4 1/2 x 5 1/2   | 36x4 36x7*        | W           | Day-Elder, E     | 3 1/2         | 3150          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Golden West, GH       | 3             | 4500          | 4 1/2 x 6       | 36x7 36x7         | W           |
| Acme, C           | 3 1/2         | ....          | 4 1/2 x 5 1/2   | 36x5 40x10        | W           | Day-Elder, F     | 5             | 4200          | 4 1/2 x 6       | 36x5 40x6d        | W           | Golden West, G        | 3 1/2         | 5000          | 4 1/2 x 6 1/2   | 36x8 36x8         | W           |
| Acme, E           | 5             | ....          | 4 1/2 x 6       | 36x6 40x12        | W           | Dearborn, E      | 1             | 1750          | 3 1/2 x 5 1/2   | 35x5 1/2 35x5 1/2 | W           | Gramm-Bern, 10        | 1 1/2         | 2495          | 3 1/2 x 5       | 36x3 1/2 36x5     | I           |
| Akr'n Multi-Trk20 | 1 1/2         | 1695          | 4 x 5 1/2       | 34x5 34x5         | B           | Dearborn, FX     | 1 1/2         | 2300          | 3 1/2 x 5 1/2   | 34x4 34x5         | W           | Gramm-Bern, 15        | 1 1/2         | 2050          | 3 1/2 x 5       | 36x3 1/2 36x5     | I           |
| American, 25      | 2 1/2         | 3350          | 4 x 6           | 36x4 36x4d        | W           | Dearborn, G      | 1 1/2         | 2180          | 3 1/2 x 5 1/2   | 34x4 34x5         | W           | Gramm-Bern, 65        | 1 1/2         | 2725          | 3 1/2 x 5       | 36x3 1/2 36x5     | W           |
| American, 40      | 4             | 4275          | 4 1/2 x 6       | 36x5 36x5d        | W           | Dearborn, 48     | 2             | 2590          | 3 1/2 x 5 1/2   | 35x5 1/2 34x7     | W           | Gramm-Bern, 20        | 2             | 3175          | 4 1/2 x 5 1/2   | 36x4 36x7*        | W           |
| Apex, G           | 1             | 1450†         | 3 1/2 x 5       | 33x5 1/2 33x5 1/2 | I           | Defiance, D      | 1             | 1695          | 3 1/2 x 5       | 35x5 1/2 35x5 1/2 | I           | Gramm-Bern, 25        | 2 1/2         | 3575          | 4 1/2 x 5 1/2   | 36x4 36x4d        | W           |
| Apex, D           | 1 1/2         | 1915          | 3 1/2 x 5 1/2   | 34x3 1/2 34x4     | I           | Defiance, E      | 1 1/2         | 2095          | 3 1/2 x 5       | 35x5 1/2 36x7     | I           | Gramm-Bern, 35        | 3 1/2         | 4375          | 4 1/2 x 5 1/2   | 36x5 40x5d        | W           |
| Apex, E           | 2 1/2         | 2695          | 4 1/2 x 5 1/2   | 36x4 36x7         | I           | DeKalb, E2 1/2   | 2             | 2275          | 4 1/2 x 5 1/2   | 36x5 36x7         | I           | Gramm-Bern, 50        | 5             | 5275          | 4 1/2 x 6       | 36x6 40x6d        | W           |
| Apex, F           | 3 1/2         | 3975          | 4 1/2 x 6       | 36x5 36x10        | I           | DeKalb, E2       | 2 1/2         | 2600          | 4 1/2 x 5 1/2   | 36x4 36x8*        | W           | Hahn, J4              | 1             | ....          | 3 1/2 x 5       | 34x5 34x5*        | W           |
| Armleder, 20      | 1             | ....          | 3 1/2 x 5       | 34x3 1/2 34x5*    | W           | DeKalb, E2       | 2 1/2         | 2250          | 4 1/2 x 5 1/2   | 34x3 1/2 34x5*    | W           | Hahn, CD              | 1 1/2         | ....          | 4 1/2 x 5 1/2   | 36x3 1/2 36x6*    | W           |
| Armleder, HW      | 2 1/2         | ....          | 4 1/2 x 5 1/2   | 36x4 36x7*        | W           | DeMartini, 1 1/2 | 1 1/2         | 2600          | 3 1/2 x 5       | 34x3 1/2 34x6     | W           | Hahn, EE              | 2 1/2         | ....          | 4 1/2 x 5 1/2   | 36x4 36x8*        | W           |
| Armleder, KW      | 3 1/2         | ....          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | DeMartini, 2     | 2             | 3300          | 4 x 5 1/2       | 36x3 1/2 36x7     | W           | Hahn, F               | 3 1/2         | ....          | 4 1/2 x 5 1/2   | 36x5 36x10*       | W           |
| Atco, B           | 1 1/2         | ....          | 3 1/2 x 5 1/2   | 34x5 1/2 36x6     | I           | DeMartini 3      | 3             | 4250          | 4 1/2 x 5 1/2   | 36x4 36x10        | W           | Hahn, EF              | 5             | ....          | 4 1/2 x 6       | 36x6 40x12        | W           |
| Atco, B1          | 1 1/2         | ....          | 3 1/2 x 5 1/2   | 34x5 1/2 36x6     | I           | DeMartini 4      | 4             | 4800          | 4 1/2 x 6       | 36x5 36x12        | W           | Hal-Fur, E            | 1             | 2200          | 4 x 5           | 35x5 1/2 35x5 1/2 | W           |
| Atlas, M.D.       | 1             | 1185          | 3 1/2 x 5       | 32x4 1/2 32x4 1/2 | W           | Denby, 31        | 3 1/2         | 1625          | 3 1/2 x 5       | 35x5 35x5         | B           | Hal-Fur, F            | 2 1/2         | 3000          | 4 1/2 x 5 1/2   | 36x5 38x7*        | W           |
| Atterbury, 20R    | 1 1/2         | 2475          | 3 1/2 x 5       | 34x3 1/2 34x5     | W           | Denby, 33        | 2 1/2         | 2300          | 3 1/2 x 5       | 35x5 35x7         | I           | Hal-Fur, F            | 3 1/2         | 4000          | 4 1/2 x 5 1/2   | 36x6 40x10†       | W           |
| Atterbury, 7CX    | 2 1/2         | 3175          | 4 1/2 x 5 1/2   | 36x4 36x4d        | W           | Denby, 34        | 2             | 2600          | 3 1/2 x 5       | 36x3 1/2 36x6     | I           | Hall, 1 1/2           | 1 1/2         | 3100          | 3 1/2 x 5       | 34x5 38x7†        | W           |
| Atterbury, 7D     | 3 1/2         | 3975          | 4 1/2 x 5 1/2   | 36x5 40x5d        | W           | Denby, 25        | 3             | 3300          | 4 1/2 x 5 1/2   | 36x4 36x7         | I           | Hall, 2 1/2           | 2 1/2         | 3275          | 4 1/2 x 5 1/2   | 36x4 36x6         | W           |
| Atterbury, 8E     | 5             | 4975          | 4 1/2 x 6       | 36x5 40x6d        | W           | Denby, 27        | 4             | 4200          | 4 1/2 x 5 1/2   | 36x5 36x5d        | I           | Hall, 3 1/2           | 3 1/2         | 4100          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           |
| Autocar, 21UF     | 1 1/2-2       | 2300          | 4 1/2 x 5 1/2   | 34x4 34x5*        | D           | Dependable, A    | 3 1/2-1       | 4850          | 4 1/2 x 6       | 36x6 40x6d        | W           | Hall, 5               | 5             | 5100          | 4 1/2 x 6       | 36x5 40x6d        | W           |
| Autocar, 21UG     | 1 1/2-2       | 2400          | 4 1/2 x 5 1/2   | 34x4 34x5*        | D           | Dependable, C    | 2 1/2         | 2350          | 4 1/2 x 5 1/2   | 34x3 1/2 34x5     | W           | Hall, 7 chain         | 7             | 5100          | 4 1/2 x 6       | 36x5 40x6d        | C           |
| Autocar, 26Y      | ....          | 4350          | 4 1/2 x 5 1/2   | 34x6 36x12        | D           | Dependable, D    | 2 1/2         | 2650          | 4 x 5 1/2       | 34x5 36x6         | W           | Harvey, WEA           | 7 1/2         | 2550          | 4 1/2 x 5 1/2   | 34x3 1/2 34x5     | W           |
| Autocar, 26-B     | ....          | 4500          | 4 1/2 x 5 1/2   | 34x6 36x12        | D           | Dependable, E    | 2 1/2         | 2950          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Harvey, WOA           | 2             | 2950          | 4 1/2 x 5 1/2   | 34x4 34x7         | W           |
| Available, H1 1/2 | 1 1/2         | 2175          | 4 x 5 1/2       | 36x3 1/2 36x5*    | W           | Dependable, G    | 3 1/2         | 3550          | 4 1/2 x 6       | 36x6 38x7         | W           | Harvey, WFA           | 2 1/2         | 3300          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Available, H2     | 2             | 2775          | 4 x 5 1/2       | 36x3 1/2 36x6*    | W           | Diamond T, O     | 1             | 1975          | 3 1/2 x 5 1/2   | 34x5 36x6†        | W           | Harvey, WHA           | 3 1/2         | 3950          | 4 1/2 x 6       | 36x5 36x5d        | W           |
| Available, H2 1/2 | 2 1/2         | 3475          | 4 x 5 1/2       | 36x4 36x8*        | W           | Diamond T, FS    | 1 1/2         | 2525          | 3 1/2 x 5 1/2   | 36x3 1/2 36x5     | W           | Harvey, WKA           | 5             | 4500          | 4 1/2 x 6       | 36x6 40x6d        | W           |
| Available, H3 1/2 | 3 1/2         | 4475          | 4 1/2 x 5 1/2   | 36x5 40x5d        | W           | Diamond T, T     | 1 1/2         | 2250          | 3 1/2 x 5 1/2   | 36x3 1/2 36x5     | W           | Hawkeye, K            | 1 1/2         | 1850          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5*    | I           |
| Available, H5     | 5             | 5375          | 4 1/2 x 6       | 36x6 40x12        | W           | Diamond T, U     | 2             | 2650          | 4 x 5 1/2       | 36x4 36x7         | W           | Hawkeye, M            | 2             | 2650          | 4 1/2 x 5 1/2   | 36x4 36x8*        | I           |
| Available, H7     | 7             | 6000          | 5 x 6           | 36x6 40x14        | B           | Diamond T, K     | 3 1/2         | 3750          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Hawkeye, N            | 3 1/2         | 3700          | 4 1/2 x 6       | 36x5 36x10*       | W           |
| Avery             | 1             | ....          | 3 x 4           | 34x5† 34x5†       | I           | Diamond T, EL    | 5             | 4325          | 4 1/2 x 6       | 36x6 40x6d        | W           | Hendrickson, M        | 3 1/2         | 3975          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           |
| Beck, A. Jr.      | 1             | 1950          | 3 1/2 x 5       | 34x3 1/2 34x4     | I           | Diamond T, S     | 5             | 4500          | 4 1/2 x 6       | 36x6 40x6d        | W           | Huffman, B            | 1 1/2         | 1995          | 3 1/2 x 5       | 34x3 1/2 34x6     | I           |
| Beck, C           | 2             | 2550          | 4 1/2 x 5 1/2   | 36x4 36x6         | I           | Diehl, A         | 1             | ....          | 3 1/2 x 5       | 34x4 1/2 35x5     | I           | Huffman, C            | 1 1/2         | 1795          | 3 1/2 x 5 1/2   | 34x3 1/2 34x6     | I           |
| Bell, M           | 1             | 1495          | 3 1/2 x 5 1/2   | 35x5 35x5†        | W           | Diehl, B         | 1 1/2         | ....          | 3 1/2 x 5       | 36x6 36x6         | I           | Hurlburt A            | 1 1/2         | 2850          | 4 1/2 x 5 1/2   | 36x4 34x5         | W           |
| Bell, E           | 1 1/2         | 2100          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5†    | W           | Dispatch, F      | 1             | 1350          | 3 1/2 x 5       | 34x4† 34x4†       | C           | Hurlburt B            | 2 1/2         | 3750          | 4 1/2 x 5 1/2   | 36x4 36x4d        | W           |
| Bell, O           | 2 1/2         | 2550          | 4 1/2 x 5 1/2   | 34x4 34x6         | W           | Doane            | 2 1/2         | 4100†         | 4 1/2 x 5 1/2   | 36x5 36x7         | C           | Hurlburt C            | 3 1/2         | 4590          | 4 1/2 x 6       | 36x5 40x6d        | W           |
| Belmont, D        | 2             | 2675          | 3 1/2 x 5       | 34x3 1/2 34x6*    | D           | Doane            | 6             | 6000†         | 5 x 6 1/2       | 36x6 40x6d        | C           | Hurlburt D            | 5             | 5500          | 4 1/2 x 6       | 36x5 40x6d        | W           |
| Belmont, F        | 3 1/2         | 3525          | 4 x 6           | 36x5 36x5d        | D           | Dodge Brothers   | 1 1/2         | 885           | 3 1/2 x 4 1/2   | 32x4† 32x4†       | B           | Indep'd't (Iowa), B   | 1             | 1665          | 3 1/2 x 5       | 34x3 1/2 34x4     | W           |
| Bessemer, G       | 1             | 1395          | 3 1/2 x 5       | 35x5 35x5†        | I           | Dorris, K-4      | 2-2 1/2       | 3400          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Indep'd't (Iowa), G   | 1 1/2         | 2040          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5     | I           |
| Bessemer, H-2     | 1 1/2         | 1995          | 3 1/2 x 5       | 36x3 1/2 36x5     | I           | Dorris, K-7      | 3 1/2         | 4400          | 4 1/2 x 5 1/2   | 36x5 36x7         | W           | Indep'd't (Ia.), H.L. | 2 1/2         | 2940          | 4 1/2 x 5 1/2   | 34x4 34x6         | W           |
| Bessemer, J-2     | 2 1/2         | 2505          | 4 1/2 x 5 1/2   | 36x4 36x4d        | I           | Double Drive B   | 3             | 4000          | 4 1/2 x 5 1/2   | 36x6 37x8*        | W           | Indep'd't (Ohio), F   | 1 1/2         | 2385          | 3 1/2 x 5       | 36x3 1/2 36x5     | W           |
| Bessemer, K-2     | 4             | 3495          | 4 1/2 x 5 1/2   | 36x5 36x10        | I           | Douglas G        | 1 1/2         | 1850          | 3 1/2 x 5 1/2   | 36x5 37x8*        | W           | Indep'd't (Ohio), H   | 3 1/2         | 3085          | 4 1/2 x 5 1/2   | 36x4 36x4d        | W           |
| Big 4, H          | 3 1/2-4       | 5000          | 4 1/2 x 6       | 36x6 36x6         | W           | Douglas I        | 3             | 2950          | 4 1/2 x 5 1/2   | 36x6 37x8*        | W           | Indep'd't (Ohio), K   | 3 1/2         | 3985          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           |
| Big 4, T          | 4             | 5500          | 4 1/2 x 6       | 36x6 36x6         | W           | Duplex, A        | 1 1/2         | 2775          | 4 x 5 1/2       | 35x5† 38x7†       | I           | Indiana, 12           | 1 1/2         | 1745          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5*    | W           |
| Big 4, K          | 7             | 6000          | 5 1/2 x 6       | 36x6 36x6         | W           | Duplex, E        | 3 1/2         | 4250          | 4 1/2 x 5 1/2   | 36x8 36x8         | I           | Indiana, 20           | 2             | 2950          | 4 1/2 x 5 1/2   | 36x4 36x7*        | W           |
| Big 4, HA         | 7             | 6000          | 4 1/2 x 6       | 36x6 36x10        | W           | Duty, 21         | 2             | 1490          | 3 1/2 x 5       | 34x3 1/2 34x5     | I           | Indiana, 25           | 2 1/2         | 3150          | 4 1/2 x 5 1/2   | 36x4 36x8*        | W           |
| Brinton, F        | 2 1/2         | 3400          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Eagle, 100-2     | 2             | 2275          | 3 1/2 x 5 1/2   | 34x4*             | I           | Indiana, 35           | 3 1/2         | 3750          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           |
| Brockway, E       | 1             | ....          | 3 1/2 x 5       | 35x5† 35x5†       | B           | Erie, E          | 1 1/2         | ....          | 3 1/2 x 5 1/2   | 36x6† 36x6†       | W           | Indiana, 51           | 5             | 4795          | 5 x 6 1/2       | 36x5 40x6d        | W           |
| Brockway, S-4     | 1 1/2         | ....          | 3 1/2 x 5       | 36x3 1/2 36x5*    | W           | Erie, A          | 2 1/2         | ....          | 4 1/2 x 5 1/2   | 36x4 36x4d        | W           | Inland, D             | 2             | 2950          | 4 x 5           | 34x5 34x6         | I           |
| Brockway, K-5     | 2 1/2         | ....          | 4 1/2 x 5 1/2   | 36x4 36x8         | W           | F.W.D., B        | 3             | 4200          | 4 1/2 x 5 1/2   | 36x6 36x6         | B           | International, S      | 1 1/2         | 1500          | 3 1/2 x 5       | 34x5† 34x5†       | I           |
| Brockway, R-4     | 3 1/2         | ....          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Facto, 1921      | 2 1/2</       |               |                 |                   |             |                       |               |               |                 |                   |             |

## Specifications of Current Motor Truck Models—Continued

| NAME AND MODEL    | Tons Capacity | Chassis Price | Bore and Stroke | TIRES         | Final Drive | NAME AND MODEL     | Tons Capacity | Chassis Price | Bore and Stroke | TIRES             | Final Drive | NAME AND MODEL   | Tons Capacity | Chassis Price | Bore and Stroke | TIRES             | Final Drive |
|-------------------|---------------|---------------|-----------------|---------------|-------------|--------------------|---------------|---------------|-----------------|-------------------|-------------|------------------|---------------|---------------|-----------------|-------------------|-------------|
|                   |               |               |                 | Front Rear    |             |                    |               |               |                 | Front Rear        |             |                  |               |               |                 | Front Rear        |             |
| Kelly-S, K-45     | 4             | \$4550        | 4 1/2 x 6 1/2   | 36x5 36x6     | C           | Norwalk, 35E. Spec | 1 1/2         | 2285          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5     | W           | Southern, 20     | 2             | \$2090        | 4 1/2 x 5 1/2   | 36x6 1/2 36x8     | W           |
| Kelly-S, K-50     | 5             | 4900          | 4 1/2 x 6 1/2   | 36x6 36x6     | C           | O. K., K1          | 1 1/2         | \$2675        | 4 x 5 1/2       | 36x3 1/2 36x5     | W           | Standard, 1-K    | 1-1 1/2       | 1800          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5     | W           |
| Kelly-S, K-60     | 6             | 5100          | 4 1/2 x 6 1/2   | 36x6 36x6     | C           | O. K., L1          | 2 1/2         | 3450          | 4 1/2 x 5 1/2   | 36x4 36x5         | W           | Standard, 7      | 2 1/2-3       | 2800          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Keystone, 40      | 2 1/2         | 2450          | 3 1/2 x 5 1/2   | 34x5 34x5     | W           | O. K., M1          | 1 1/2         | 4250          | 4 1/2 x 6       | 36x5 36x5d        | W           | Standard, 66     | 3 1/2-4       | 3600          | 4 1/2 x 5 1/2   | 36x4 36x10        | W           |
| Kimball, AB       | 2 1/2         | 3675          | 4 x 6           | 36x4 36x7     | W           | Ogden, A1          | 1 1/2         | 2375          | 3 1/2 x 5       | 36x3 1/2 36x5     | W           | Standard, 5-K    | 5-7           | 4400          | 4 1/2 x 6       | 36x6 40x12        | W           |
| Kimball, AK       | 3             | 4500          | 4 1/2 x 6       | 36x4 36x8     | W           | Ogden, E           | 2 1/2         | 2975          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Sterling, 1 1/2  | 1 1/2         | 2585          | 4 x 5 1/2       | 36x3 1/2 36x5     | W           |
| Kimball, AE       | 4             | 5000          | 4 1/2 x 6       | 36x4 36x10    | W           | Old Hickory, W     | 1             | 2175          | 3 1/2 x 5       | 36x3 1/2 36x4     | W           | Sterling, 2      | 2             | 3085          | 4 x 5 1/2       | 36x4 36x6         | W           |
| Kimball, AF       | 5             | 5500          | 5 x 6           | 36x6 40x7d    | W           | Old Reliable, A    | 1 1/2         | 2350          | 4 x 5           | 36x4 36x6         | W           | Sterling, 2 1/2  | 2 1/2         | 3290          | 4 1/2 x 5 1/2   | 36x4 36x4d        | W           |
| Kissel, Express   | 1             | 1985          | 3 1/2 x 5 1/2   | 34x5 34x5     | W           | Old Reliable, B    | 2 1/2         | 3500          | 4 1/2 x 6       | 36x4 36x4d        | W           | Sterling, 3 1/2  | 3 1/2         | 4325          | 4 1/2 x 6 1/2   | 36x5 40x5d        | W           |
| Kissel, Utility   | 1 1/2         | 1975          | 3 1/2 x 5 1/2   | 34x5 34x5     | W           | Old Reliable, C    | 3 1/2         | 4250          | 4 1/2 x 6       | 36x5 36x5d        | W           | Sterling, 5-W    | 5             | 4950          | 5 x 6 1/2       | 36x6 40x5d        | W           |
| Kissel, Freight   | 2 1/2         | 2875          | 3 1/2 x 5 1/2   | 34x5 34x5     | W           | Old Reliable, KLM  | 7             | 5250          | 4 1/2 x 6       | 36x6 40x6d        | W           | Sterling, 5-C    | 5             | 5500          | 5 x 6 1/2       | 36x6 40x6d        | W           |
| Kissel, H. D.     | 4             | 3675          | 4 1/2 x 6       | 36x4 36x7     | W           | Old Reliable Econ. | 7 1/2         | 6000          | 4 1/2 x 6       | 36x6 40x7d        | C           | Sterling, 7 1/2  | 7 1/2         | 6000          | 5 x 6 1/2       | 36x6 40x7d        | C           |
| Kleiber, AA       | 1             | 2900          | 4 1/2 x 5 1/2   | 34x3 1/2 34x5 | W           | Olympic, A         | 2 1/2         | 1095          | 3 1/2 x 5 1/2   | 35x5 35x5         | I           | Stewart, 14      | 1 1/2         | 1345          | 3 1/2 x 5 1/2   | 32x4 1/2 32x4 1/2 | I           |
| Kleiber, BB       | 2 1/2         | 3100          | 4 1/2 x 5 1/2   | 34x3 1/2 34x5 | W           | Oshkosh, A         | 2 1/2         | 3500          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Stewart, 15      | 1 1/2         | 1875          | 3 1/2 x 5       | 35x5 35x5         | I           |
| Kleiber, B        | 3 1/2         | 3600          | 4 1/2 x 5 1/2   | 34x3 1/2 34x5 | W           | Oshkosh, AA        | 2 1/2         | 3750          | 3 1/2 x 5       | 36x6 36x6         | W           | Stewart, 7       | 2 1/2         | 2200          | 3 1/2 x 5       | 34x3 1/2 34x5     | I           |
| Kleiber, C        | 5             | 4800          | 4 1/2 x 5 1/2   | 34x3 1/2 34x5 | W           | Oshkosh, BB        | 2 1/2         | 3850          | 3 1/2 x 5       | 36x6 36x6         | W           | Stewart, 7-X     | 2 1/2         | 2800          | 4 1/2 x 5 1/2   | 34x4 34x7         | I           |
| Koehler, D        | 1 1/2         | 1995          | 5 x 6 1/2       | 36x6 40x12    | W           | Packard, EC        | 1 1/2-3       | 3500          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Stewart, 10      | 2 1/2         | 2950          | 4 1/2 x 5 1/2   | 34x4 34x7         | I           |
| Koehler, M        | 2 1/2         | 3175          | 4 x 5 1/2       | 36x4 36x7     | W           | Packard, EX        | 1 1/2-3       | 4000          | 4 1/2 x 5 1/2   | 36x6 40x8         | W           | Stewart, 10-X    | 3 1/2         | 3850          | 4 1/2 x 6       | 36x5 36x5d        | I           |
| Koehler, MCS      | 2 1/2         | 3275          | 4 x 5 1/2       | 36x4 36x7     | W           | Packard, ED        | 2 1/2-3       | 4100          | 4 1/2 x 5 1/2   | 36x6 40x8         | W           | Stoughton, A     | 1 1/2         | 1995          | 3 1/2 x 5 1/2   | 34x4 1/2 34x4 1/2 | W           |
| Koehler, F        | 3 1/2         | 4150          | 4 1/2 x 5 1/2   | 36x4 36x10    | W           | Packard, EF        | 4-7 1/2       | 4500          | 5 x 5 1/2       | 36x6 40x6d        | W           | Stoughton, B     | 1 1/2         | 2350          | 3 1/2 x 5 1/2   | 36x3 1/2 36x5     | W           |
| Koehler, MT, Trac | 5             | 3275          | 4 x 5 1/2       | 36x4 36x7     | W           | Paige, 52-19       | 1 1/2         | 2880          | 4 x 5 1/2       | 36x4 36x5         | W           | Stoughton, D     | 2             | 2800          | 4 x 5 1/2       | 36x4 36x7         | W           |
| Lange, B          | 2 1/2         | 3350          | 4 1/2 x 5 1/2   | 36x4 36x7     | C           | Paige, 54-20       | 2 1/2         | 3400          | 4 1/2 x 5 1/2   | 36x4 36x5         | W           | Stoughton, F     | 3             | 3600          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Larrabee, X-Z     | 3 1/2-4       | 1925          | 3 1/2 x 4 1/2   | 34x5 34x5     | B           | Paige, 51-18       | 2 1/2         | 4285          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Sullivan, E      | 2             | 3350          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Larrabee, U       | 1 1/2         | 2400          | 3 1/2 x 4 1/2   | 34x5 34x5     | W           | Parker, F20        | 1 1/2         | 3500          | 4 x 6           | 36x4 36x4d        | W           | Superior, D      | 3 1/2         | 4650          | 4 1/2 x 6       | 36x5 36x5d        | W           |
| Larrabee, K       | 2 1/2         | 3200          | 4 1/2 x 5 1/2   | 36x4 36x7     | W           | Parker, J20        | 3 1/2         | 4400          | 4 1/2 x 6       | 36x5 40x5d        | W           | Superior, E      | 1 1/2         | 1650          | 3 1/2 x 5       | 34x4 1/2 34x4     | I           |
| Larrabee, L-4     | 3 1/2         | 4000          | 4 1/2 x 5 1/2   | 36x4 36x7     | W           | Parker, M20        | 5             | 5500          | 4 1/2 x 6       | 36x6 40x6d        | W           | Super Truck, 50  | 2 1/2         | 2600          | 4 1/2 x 5 1/2   | 36x4 36x6         | I           |
| Larrabee, W       | 5             | 4800          | 4 1/2 x 5 1/2   | 36x4 36x7     | W           | Patriot, Wash'tn   | 3             | 3000          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Super Truck, 70  | 3 1/2         | 3300          | 4 x 6           | 36x4 36x8         | W           |
| Laedighaus, C     | 1             | 1695          | 3 1/2 x 5       | 35x5 35x5     | W           | Piedmont, 4-30     | 1             | 1200          | 3 1/2 x 5       | 34x4 34x4         | W           | Super Truck, 100 | 5             | 4300          | 4 1/2 x 6       | 36x5 40x5d        | W           |
| Laedighaus, W     | 1 1/2         | 2490          | 3 1/2 x 5 1/2   | 34x3 1/2 34x5 | W           | Pierce-Arrow       | 2             | 3200          | 4 x 5 1/2       | 36x4 36x4d        | W           | Super Truck, 150 | 7 1/2         | 5300          | 4 1/2 x 6       | 36x5 40x12        | W           |
| Laedighaus, K     | 2-2 1/2       | 3150          | 4 1/2 x 5 1/2   | 36x4 36x7     | W           | Pierce-Arrow       | 3 1/2         | 4350          | 4 1/2 x 6 1/2   | 36x5 36x5d        | W           | Texas, A38       | 3 1/2         | 1095          | 3 1/2 x 5       | 33x4 33x4         | I           |
| Macar, L          | 1 1/2         | 2700          | 4 1/2 x 5 1/2   | 36x4 36x6     | W           | Pioneer, 59        | 1             | 1550          | 3 1/2 x 4 1/2   | 32x4 1/2 32x4 1/2 | W           | Texas, TK39      | 1 1/2         | 1550          | 3 1/2 x 5       | 36x6 36x7         | W           |
| Macar, H-A        | 2             | 3100          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Pittsburgher, C-21 | 3             | 3800          | 3 1/2 x 4 1/2   | 36x4 36x7         | W           | Tiffin, GW       | 1 1/2         | 2400          | 4 1/2 x 5 1/2   | 36x3 1/2 36x5     | W           |
| Macar, H-2        | 2             | 4200          | 4 1/2 x 6       | 36x5 36x5d    | W           | Power, F           | 3             | 3400          | 3 1/2 x 4 1/2   | 36x6 36x6         | W           | Tiffin, MW       | 2 1/2         | 3100          | 4 1/2 x 5 1/2   | 36x4 36x3 1/2     | W           |
| Macar, G          | 5-6           | 4950          | 4 1/2 x 6       | 36x5 40x6d    | W           | Premcar, B-143     | 1 1/2         | 2475          | 3 1/2 x 5       | 36x6 36x6         | W           | Tiffin, F50      | 2 1/2         | 4100          | 4 1/2 x 5 1/2   | 36x5 40x6d        | W           |
| MacDonald, A      | 7 1/2         | 5750          | 4 1/2 x 6       | 40x7 40x14    | I           | Rainier, R-21      | 3 1/2         | 1990          | 3 1/2 x 5       | 35x5 35x5         | W           | Tiffin, F60      | 6             | 4800          | 4 1/2 x 6       | 36x6 40x6d        | W           |
| Mack, AB D.R.     | 1 1/2         | 3150          | 4 x 5           | 36x4 36x3 1/2 | D           | Rainier, R-19      | 1 1/2         | 2150          | 3 1/2 x 5       | 34x3 1/2 34x4     | W           | Titan, HT        | 3 1/2         | 4550          | 4 1/2 x 6       | 36x4 36x7         | I           |
| Mack, AB          | 2 1/2         | 3400          | 4 x 5           | 36x4 36x4d    | C           | Rainier, R-16      | 1 1/2         | 2490          | 3 1/2 x 5       | 34x3 1/2 34x5     | W           | Titan, HD        | 6             | 5400          | 4 1/2 x 6       | 36x5 40x6d        | I           |
| Mack, AB Chain    | 1 1/2         | 3000          | 4 x 5           | 36x4 36x3 1/2 | C           | Rainier, R-18      | 2 1/2         | 2890          | 4 1/2 x 5 1/2   | 36x4 36x6         | W           | Titan, TS        | 2 1/2         | 3400          | 4 1/2 x 5 1/2   | 36x4 36x4d        | I           |
| Mack, AB Chain 2  | 2 1/2         | 3300          | 4 x 5           | 36x4 36x4d    | C           | Rainier, R-20      | 2 1/2         | 3550          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           | Tower, J         | 1 1/2         | 2900          | 4 1/2 x 5 1/2   | 36x5 36x7         | W           |
| Mack, AB D.R.     | 2 1/2         | 3750          | 4 x 5           | 36x4 36x4d    | C           | Rainier, R-15      | 2 1/2         | 4400          | 4 1/2 x 6       | 36x5 36x5d        | W           | Tower, G         | 2 1/2         | 3200          | 4 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Mack, AC Chain    | 3 1/2         | 4950          | 5 x 6           | 36x6 40x6d    | C           | Rainier, R-17      | 2 1/2         | 5775          | 4 1/2 x 6       | 36x6 36x6d        | W           | Tower, H         | 3 1/2         | 4100          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           |
| Mack, AC Chain 2  | 5             | 5850          | 5 x 6           | 36x6 40x6d    | C           | Ranger, TK-22-2    | 2             | 2100          | 3 1/2 x 5       | 36x6 36x6         | W           | Traffic, C       | ...           | 1595          | 3 1/2 x 5       | 34x3 1/2 34x5     | I           |
| Mack, AC Chain 3  | 6 1/2         | 5750          | 5 x 6           | 36x6 40x6d    | C           | Reo, F             | 3 1/2-4 1/2   | 1245          | 4 1/2 x 5 1/2   | 36x4 1/2 36x4 1/2 | B           | Transport, 20    | 3             | 1895          | 3 1/2 x 5       | 34x3 1/2 34x4     | I           |
| Mack, AC Chain 4  | 7 1/2         | 6000          | 5 x 6           | 36x6 40x6d    | C           | Reliance, 10A      | 1 1/2         | 2400          | 4 x 5 1/2       | 36x3 1/2 36x4     | I           | Transport, 30    | 1 1/2         | 1395          | 3 1/2 x 5 1/2   | 34x3 1/2 34x4     | I           |
| Mack, AC Chain 5  | 10            | 5500          | 5 x 6           | 36x6 40x6d    | C           | Reliance, 20B      | 2 1/2         | 3195          | 4 1/2 x 5 1/2   | 36x4 36x4d        | I           | Transport, 50    | 1 1/2         | 1995          | 3 1/2 x 5       | 36x3 1/2 36x5     | I           |
| Mack, AC Chain 6  | 13            | 5750          | 5 x 6           | 36x6 40x6d    | C           | Republic, 75       | 1 1/2         | 1395          | 3 1/2 x 5       | 35x5 35x5         | I           | Transport, 70    | 3 1/2         | 2785          | 4 1/2 x 5 1/2   | 36x4 36x7         | I           |
| Mack, AC Chain 7  | 15            | 6000          | 5 x 6           | 36x6 40x6d    | C           | Republic, 10       | 1 1/2         | 1695          | 3 1/2 x 5       | 35x5 35x5         | I           | Traylor, B       | 1 1/2         | 3885          | 4 1/2 x 6       | 36x4 36x10        | I           |
| Mack, AC Chain 8  | 18            | 6250          | 5 x 6           | 36x6 40x6d    | C           | Republic, 10Exp.   | 1 1/2         | 1795          | 3 1/2 x 5       | 34x3 1/2 34x5     | I           | Traylor, C       | 2 1/2         | 2390          | 3 1/2 x 5 1/2   | 36x3 1/2 36x5     | W           |
| Mack, AC Chain 9  | 20            | 6500          | 5 x 6           | 36x6 40x6d    | C           | Republic, 11X      | 1 1/2         | 2155          | 3 1/2 x 5       | 34x3 1/2 34x5     | I           | Traylor, D       | 2 1/2         | 2850          | 4 x 5 1/2       | 36x4 36x7         | W           |
| Mack, AC Chain 10 | 22            | 6775          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 19       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Traylor, E       | 4             | 4450          | 4 1/2 x 6       | 36x5 40x10        | W           |
| Mack, AC Chain 11 | 24            | 7000          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 20       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Traylor, F       | 4             | 4700          | 4 1/2 x 6       | 36x6 40x6d        | W           |
| Mack, AC Chain 12 | 26            | 7275          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 25       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, AA     | 3 1/2-4 1/2   | 1385          | 3 1/2 x 5       | 34x4 1/2 34x4 1/2 | I           |
| Mack, AC Chain 13 | 28            | 7500          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 30       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, A      | 1 1/2         | 2350          | 3 1/2 x 5 1/2   | 34x3 1/2 34x4     | I           |
| Mack, AC Chain 14 | 30            | 7775          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 35       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, B      | 1 1/2         | 2700          | 3 1/2 x 5 1/2   | 36x4 36x6         | I           |
| Mack, AC Chain 15 | 32            | 8000          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 40       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, C      | 2 1/2         | 2950          | 4 x 5 1/2       | 36x4 36x7         | I           |
| Mack, AC Chain 16 | 34            | 8250          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 45       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, D      | 2 1/2         | 1995          | 3 1/2 x 5 1/2   | 36x4 36x5         | W           |
| Mack, AC Chain 17 | 36            | 8500          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 50       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, E      | 2 1/2         | 2550          | 3 1/2 x 5 1/2   | 36x4 36x5         | W           |
| Mack, AC Chain 18 | 38            | 8750          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 55       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, F      | 2 1/2         | 2900          | 3 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Mack, AC Chain 19 | 40            | 9000          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 60       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, G      | 2 1/2         | 2750          | 4 x 5 1/2       | 36x4 36x7         | I           |
| Mack, AC Chain 20 | 42            | 9250          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 65       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Triangle, H      | 2 1/2         | 2900          | 3 1/2 x 5 1/2   | 36x4 36x7         | W           |
| Mack, AC Chain 21 | 44            | 9500          | 4 1/2 x 5 1/2   | 36x4 36x4d    | W           | Republic, 70       | 2 1/2         | 3095          | 4 1/2 x 5 1/2   | 36x5 36x5d</      |             |                  |               |               |                 |                   |             |



## Specifications of Current Motor Truck Models—Continued

| NAME AND MODEL  | Tons Capacity | Chassis Price | Bore and Stroke | TIRES             | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES             | Final Drive | NAME AND MODEL  | Tons Capacity | Chassis Price | Bore and Stroke | TIRES          | Final Drive |
|-----------------|---------------|---------------|-----------------|-------------------|-------------|----------------|---------------|---------------|-----------------|-------------------|-------------|-----------------|---------------|---------------|-----------------|----------------|-------------|
|                 |               |               |                 | Front Rear        |             |                |               |               |                 | Front Rear        |             |                 |               |               |                 | Front Rear     |             |
| Watson, E       | 1             | \$1865        | 3 1/2 x 5 1/4   | 35x5 1/2 35x5 1/2 | W           | Wichita, S     | 5             | \$5000        | 4 1/2 x 6       | 36x6 40x6d        | W           | Winther, 39     | 1 1/2         | \$2450        | 3 1/2 x 5       | 34x3 1/2 34x6  | I           |
| Watson, N       | 1             | 4250          | 4 1/2 x 5 1/4   | 36x5 36x10        | W           | Wilcox, AA     | 1             | 1900          | 3 1/2 x 5 1/2   | 36x4 36x4         | W           | Winther, 45     | 2             | 3250          | 4 x 5           | 34x4 34x4d     | I           |
| Western, W1 1/2 | 1 1/2         | 2550          | 4 1/2 x 5 1/4   | 36x3 1/2 36x5     | W           | Wilcox, BB     | 1             | 2550          | 4 1/2 x 5       | 36x4 36x5         | W           | Winther, 50     | 2 1/2         | 3905          | 4 x 6           | 38x7 42x9 1/2  | I           |
| Western, L1 1/2 | 1 1/2         | 2550          | 4 1/2 x 5 1/4   | 36x3 1/2 36x5     | W           | Wilcox, D      | 2 1/2         | 3000          | 4 1/2 x 5       | 36x4 36x3 1/2     | W           | Winther, 70     | 3 1/2         | 4200          | 4 x 6           | 36x5 36x5d     | I           |
| Western, W2 1/2 | 2 1/2         | 3250          | 4 1/2 x 5 1/4   | 36x4 36x7         | W           | Wilcox, E      | 3 1/2         | 3950          | 4 1/2 x 6       | 36x5 36x5d        | W           | Winther, 450    | 3 1/2         | 3690          | 4 x 5           | 34x5 36x6      | I           |
| Western, L2 1/2 | 2 1/2         | 3250          | 4 1/2 x 5 1/4   | 36x4 36x7         | W           | Wilcox, F      | 5             | 4350          | 4 1/2 x 5 1/2   | 36x5 40x6d        | W           | Winther, 109    | 5             | 5250          | 4 1/2 x 6       | 36x6 40x5d     | I           |
| Western, W3 1/2 | 3 1/2         | 4250          | 4 1/2 x 5 1/4   | 36x5 40x5d        | W           | Wilson, F      | 1 1/2         | 2270          | 3 1/2 x 5       | 36x3 1/2 36x5     | W           | Winther, 140    | 7             | 5900          | 5 x 6           | 36x6 40x7d     | I           |
| White, 15       | 1 1/2         | 2400          | 3 1/2 x 5 1/4   | 34x5 1/2 34x5 1/2 | B           | Wilson, EA     | 2 1/2         | 2825          | 4 1/2 x 5 1/4   | 36x4 36x7         | W           | Wisconsin, B    | 1             | 1950          | 4 x 5 1/2       | 34x5 34x5 1/2  | W           |
| White, 20       | 2             | 3250          | 3 1/2 x 5 1/4   | 36x4 36x7         | D           | Wilson, G      | 3 1/2         | 3685          | 4 1/2 x 5 1/2   | 36x5 36x5d        | W           | Wisconsin, C    | 1 1/2         | 2500          | 4 1/2 x 5 1/4   | 36x6 36x6 1/2  | W           |
| White, 40       | 4             | 4200          | 3 1/2 x 5 1/4   | 36x5 40x5d        | D           | Wilson, H      | 5             | 4520          | 4 1/2 x 6       | 36x6 40x6d        | W           | Wisconsin, D    | 2 1/2         | 3500          | 4 1/2 x 6 1/4   | 36x6 36x10     | W           |
| White, 45       | 5             | 4500          | 4 1/2 x 5 1/4   | 36x6 40x6d        | D           | Winther, 751   | 1             | 1795          | 3 1/2 x 5       | 31x4 1/2 35x5 1/2 | I           | Wisconsin, E    | 3 1/2         | 4000          | 5 x 6 1/4       | 36x6 36x12 1/2 | W           |
| White Hick, E   | 1             | 1225          | 3 1/2 x 5       | 34x5 1/2 34x5 1/2 | W           | Winther, 430   | 1 1/2         | 2850          | 3 1/2 x 5       | 32x4 32x4         | I           | Witt-Will, N    | 1 1/2         | 2750          | 3 1/2 x 5       | 36x3 1/2 36x5  | W           |
| White Hick, H   | 1 1/2         | 1375          | 3 1/2 x 5       | 36x3 1/2 36x5     | W           |                |               |               |                 |                   |             | Witt-Will, P    | 2 1/2         | 3250          | 4 1/2 x 5 1/4   | 36x3 1/2 36x7  | W           |
| White Hick, K   | 2 1/2         | 1675          | 4 1/2 x 5 1/4   | 36x4 36x5         | W           |                |               |               |                 |                   |             | Wolverine, J    | 1             | 2125          | 3 1/2 x 5       | 34x3 34x4      | I           |
| Wichita, K      | 1             | 2300          | 3 1/2 x 5 1/4   | 36x3 1/2 36x4     | W           |                |               |               |                 |                   |             | Wolverine, J    | 1 1/2         | 2375          | 3 1/2 x 5       | 34x3 34x5      | I           |
| Wichita, L      | 1 1/2         | 2600          | 3 1/2 x 5 1/4   | 36x3 1/2 36x5     | W           |                |               |               |                 |                   |             | Wolverine, J    | 2             | 2640          | 3 1/2 x 5       | 34x4 34x7      | I           |
| Wichita, M      | 2             | 2800          | 3 1/2 x 5 1/4   | 36x3 1/2 36x6     | W           |                |               |               |                 |                   |             | Wolverine, J    | 2 1/2         | 3425          | 4 1/2 x 5 1/4   | 36x5 36x10     | I           |
| Wichita, R      | 2 1/2         | 3000          | 3 1/2 x 5 1/4   | 36x4 36x7         | W           |                |               |               |                 |                   |             | Wolverine, L    | 3 1/2         | 4100          | 4 1/2 x 5 1/2   | 36x5 36x10     | I           |
| Wichita, RX     | 3 1/2         | 3600          | 4 1/2 x 6       | 36x4 36x8         | W           |                |               |               |                 |                   |             | Yellow Cab, M21 | 3 1/2         | 2050          | 3 1/2 x 5       | 32x4 32x4      | B           |
| Wichita, O      | 3 1/2         | 4000          | 4 1/2 x 6       | 36x5 36x5d        | W           |                |               |               |                 |                   |             | Yellow Cab, M41 | 1 1/2         | 2350          | 3 1/2 x 5       | 34x4 34x4 1/2  | W           |

\*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl.  
Trac., Tractor. \*\*Canadian made.  
Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. \*Tires—optional. †Pneumatic Tires. All others solid. ‡Price includes body. §—Price includes several items of equipment.

## Farm Tractor Specifications and Prices

| TRADE NAME        | Rating  | Price  | Wheels or Crawlers | Engine | Cylinders: Bore, Stroke | Fuel            | Flow Capacity | TRADE NAME      | Rating        | Price     | Wheels or Crawlers | Engine | Cylinders: Bore, Stroke | Fuel            | Flow Capacity   | TRADE NAME      | Rating     | Price  | Wheels or Crawlers | Engine | Cylinders: Bore, Stroke | Fuel            | Flow Capacity   |                 |      |   |
|-------------------|---------|--------|--------------------|--------|-------------------------|-----------------|---------------|-----------------|---------------|-----------|--------------------|--------|-------------------------|-----------------|-----------------|-----------------|------------|--------|--------------------|--------|-------------------------|-----------------|-----------------|-----------------|------|---|
| All-In One        | 16-30   | \$1975 | 3                  | Clim.  | 4-5 x 6 1/2             | GDK             | 3-4           | G-O             | 14-28         | \$1485    | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G or K          | 3               | Port Huron      | 12-25      | \$1600 | 4                  | Chief  | 4-3 1/2 x 6             | G, K            | 3               |                 |      |   |
| Allis-Chalm. B    | 6-12    | 925    | 2                  | LeR.   | 4-3 1/2 x 4 1/2         | Gas.            | 1             | Grain Belt      | 18-36         | 2150      | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G or K          | 4               | Prairie Dog     | 9-18       | 650    | 3                  | Wauk.  | 4-3 1/2 x 5 1/2         | Gas.            | 12              |                 |      |   |
| Allis-Chalm. G.P. | 6-12    | 795    | 2                  | LeR.   | 4-3 1/2 x 4 1/2         | Gas.            | 1-2           | Gray            | 18-36         | 2000      | 3                  | Wauk.  | 4-4 1/2 x 5 1/2         | Gas.            | 4               | Prairie Dog D   | 15-30      | 1250   | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | Gas.            | 3               |                 |      |   |
| Allis-Chalm. L    | 12-20   | 1350   | 2                  | Midw.  | 4-4 1/2 x 5 1/2         | Gas.            | 2-3           | Ground Hog      | 19-31         | 2000      | 4                  | Erd.   | 4-4 x 6                 | G or K          | 3               | Ranger Cul.     | 8-16       | .....  | 4                  | LeR.   | 4-3 1/2 x 4 1/2         | Gas.            | 1               |                 |      |   |
| Allis-Chalm. M    | 18-30   | 2150   | 4                  | Own    | 4-4 1/2 x 5 1/2         | G or K          | 3-4           | Gt. Western St  | 20-30         | 1950      | 4                  | Beav.  | 4-4 1/2 x 6             | K               | 4               | T-20            | 8-16       | .....  | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G or K          | 3-4             |                 |      |   |
| Allis-Chalm. N    | 10-18   | 875    | 4                  | Own    | 4-4 1/2 x 5 1/2         | G, K            | 3             | Hart-Parr       | 20            | 945       | 4                  | Own    | 2-5 1/2 x 6 1/2         | K, D.           | 2               | Reed            | 15-30      | 1985   | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G or K          | 3               |                 |      |   |
| Allwork           | 11-23   | 1775   | 4                  | Own    | 4-4 1/2 x 5 1/2         | G or K          | 3             | Hart-Parr       | 30            | 1295      | 4                  | Own    | 2-6 1/2 x 7             | K, D.           | 3               | Reed            | 18-36      | 2185   | 4                  | Wauk.  | 4-5 x 6 1/2             | Gas.            | 4               |                 |      |   |
| Allwork           | 14-23   | 1525   | 4                  | Own    | 4-5 x 6                 | G or K          | 3             | Heider          | 9-16          | 1170      | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G, K            | 2               | Reliable        | 10-20      | 885    | 4                  | Own    | 2-6 x 7                 | Ker.            | 2               |                 |      |   |
| Andrews Kin. D    | 13-31   | 2500   | 4                  | Clim.  | 4-5 x 6 1/2             | G, K            | 2-3           | Heider          | 12-20         | 1395      | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G, K            | 3               | Rex             | 12-25      | 1600   | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G or K          | 3               |                 |      |   |
| Appleton          | 12-21   | 1500   | 4                  | Buda   | 4-4 1/2 x 5 1/2         | G, K            | 2-3           | Heider          | 6-10          | 1050      | 4                  | LeR.   | 4-3 1/2 x 4 1/2         | Gas.            | 1               | Russell         | 12-24      | 1500   | 4                  | Own    | 4-4 1/2 x 5 1/2         | G or K          | 2-3             |                 |      |   |
| Aro               | 1921-22 | 3-5    | 495                | 4      | Own                     | 1-4 1/2 x 5     | Gas.          | 1               | Hicks         | 20-30     | .....              | 4      | 4-4 1/2 x 6             | K or G          | 4               | Russell         | 15-30      | 2200   | 4                  | Own    | 4-5 x 6 1/2             | G or K          | 3-4             |                 |      |   |
| Aultman-T         | 15-33   | 2200   | 4                  | Clim.  | 4-5 x 6 1/2             | G, K            | 4             | Huber Light 4   | 12-25         | 1185      | 4                  | Wauk.  | 4-4 1/2 x 5 1/2         | G or K          | 3               | Russell         | 20-35      | 3000   | 4                  | Own    | 4-5 1/2 x 7             | G or K          | 4-5             |                 |      |   |
| Aultman-T         | 22-45   | 3420   | 4                  | Own    | 4-5 1/2 x 6             | G, K            | 6             | Huber Super 4   | 15-30         | 1885      | 4                  | Midw.  | 4-4 1/2 x 6             | Gas             | 3               | Russell         | 30-60      | 5000   | 4                  | Own    | 4-8 x 10                | G or K          | 8-10            |                 |      |   |
| Aultman-T         | 30-60   | 4500   | 4                  | Own    | 4-7 x 9                 | G, K, D         | 8             | Illinois, Super | 18-30         | .....     | 4                  | Clim.  | 4-5 x 6 1/2             | G, K            | 4               | Samson          | 10-20      | 1250   | 4                  | Nor    | 4-4 x 5 1/2             | G, K            | 2               |                 |      |   |
| Automot. B-3      | 12-24   | 1785   | 4                  | Here.  | 4-4 x 5                 | Gas.            | 2-3           | Imperial        | 5-10          | 895       | 2                  | LeR.   | 4-3 1/2 x 4 1/2         | G, K, D         | 10              | Sandusky        | 18-36      | 1750   | 4                  | Own    | 4-5 x 6 1/2             | G, K, D         | 2               |                 |      |   |
| Avery, SR, Cul    | 5-10    | .....  | 4                  | Own    | 4-3 x 4                 | G, K            | 2             | International   | 8-16          | 900       | 4                  | Own    | 4-4 1/2 x 5             | Gas.            | 2               | Shawnee Com.    | 6-12       | .....  | 2                  | LeR.   | 4-3 1/2 x 4 1/2         | Gas.            | 1               |                 |      |   |
| Avery             | 8-16    | .....  | 4                  | Own    | 4-3 x 4                 | G, K            | 2             | International   | 15-30         | 1750      | 4                  | Own    | 4-4 1/2 x 5             | G, K, D         | 4               | Shawnee Com.    | 9-18       | .....  | 2                  | Gray   | 4-3 1/2 x 4 1/2         | Gas.            | 1               |                 |      |   |
| Avery             | 12-20   | .....  | 4                  | Own    | 2-5 1/2 x 6             | G, K, D         | 2-3           | International   | 20-40         | .....     | 2                  | Chief  | 4-4 1/2 x 6             | G, K, D         | 3-4             | Shelby          | 15-30      | .....  | 4                  | Beav.  | 4-4 1/2 x 6             | G, K            | 3               |                 |      |   |
| Avery             | 12-25   | .....  | 4                  | Own    | 2-6 1/2 x 7             | G, K, D         | 3-4           | J-T             | 20-40         | .....     | 2                  | Chief  | 4-4 1/2 x 6             | G, K, D         | 3-4             | Shelby          | 10-20      | .....  | 4                  | Erd.   | 4-4 x 6                 | G or K          | 2-3             |                 |      |   |
| Avery             | 11-28   | .....  | 4                  | Own    | 4-4 1/2 x 7             | G, K, D         | 3-4           | Knudsen         | 16-32         | 1475      | 4                  | Clim.  | 4-5 x 6 1/2             | .....           | 4               | Short Turn      | 20-40      | 1500   | 3                  | Beav.  | 4-4 1/2 x 6             | G, K            | 3               |                 |      |   |
| Avery             | 18-36   | .....  | 4                  | Own    | 4-5 1/2 x 7             | G, K, D         | 4-5           | Knudsen         | 25-45         | 2500      | 4                  | Own    | 4-5 x 9                 | Gas             | 4-6             | Square T        | 18-35      | 2075   | 3                  | Clim.  | 4-5 x 6 1/2             | G, K            | 3               |                 |      |   |
| Avery             | 25-50   | .....  | 4                  | Own    | 4-6 1/2 x 7             | G, K, D         | 5-6           | LaCrosse        | 6-12          | 650       | 4                  | Own    | 2-4 x 6                 | G, K            | 3               | Steady Pull     | 12-24      | 1485   | 4                  | Own    | 4-4 x 5                 | Gas.            | 3               |                 |      |   |
| Avery             | 45-65   | .....  | 4                  | Own    | 4-7 1/2 x 8             | G, K, D         | 8-10          | LaCrosse        | 12-24         | 985       | 4                  | Own    | 2-6 x 7                 | G or K          | 3               | Stinson         | 18-36      | 1835   | 4                  | Beav.  | 4-4 1/2 x 6             | G, K            | 4               |                 |      |   |
| Bates             | 15-25   | .....  | 4                  | Own    | 4-4 1/2 x 6             | Ker.            | 3             | Lauson          | 5-12          | 1495      | 4                  | Midw.  | 4-4 1/2 x 5 1/2         | Gas.            | 3               | Stone           | 20-40      | 2250   | 4                  | Beav.  | 4-4 1/2 x 6             | G, K            | 4               |                 |      |   |
| Bates Mule H      | 15-25   | .....  | 4                  | Midw.  | 4-4 1/2 x 5 1/2         | Gas.            | 3             | Lauson          | 20            | 1525      | 4                  | Beav.  | 4-4 1/2 x 6             | G or K          | 3-4             | Toga            | 15-27      | 2625   | 4                  | Wisc.  | 4-4 1/2 x 6             | Gas.            | 3-4             |                 |      |   |
| Bates Mule F      | 18-25   | .....  | 2                  | Midw.  | 4-4 1/2 x 5 1/2         | Gas.            | 3             | Lauson          | 21            | 1530      | 4                  | Beav.  | 4-4 1/2 x 6             | G or K          | 3-4             | Titan           | 10-20      | 900    | 4                  | Own    | 2-6 1/2 x 8             | G, K, D         | 3               |                 |      |   |
| Bates Mule G      | 25-35   | .....  | 2                  | Midw.  | 4-4 1/2 x 6             | Gas.            | com.          | Lauson Road     | 12-18         | 2225      | 4                  | Beav.  | 4-4 1/2 x 6             | K               | 3-4             | Toro Cultivator | 6-10       | .....  | 3                  | Wauk.  | 4-4 1/2 x 6 1/2         | Gas.            | 3-4             |                 |      |   |
| Bean              | 8-16    | .....  | 1                  | Own    | 4-3 1/2 x 4             | G, K            | 2-3           | Leader          | 16-22         | 1095      | 4                  | Own    | 2-6 1/2 x 6 1/2         | G, K, D         | 2-3             | Toro Cultivator | 10-20      | 895    | 2                  | Own    | 4-6 1/2 x 7             | Ker.            | 2-3             |                 |      |   |
| Beeman            | 2-4     | 315    | 4                  | Own    | 1-3 1/2 x 4 1/2         | Gas.            | 2             | Leader          | 16-22         | 985       | 4                  | Clim.  | 4-5 x 6 1/2             | G, K            | 3-4             | Townsend        | 15-30      | 1495   | 2                  | Own    | 4-7 x 8                 | Ker.            | 3-4             |                 |      |   |
| Best              | 30      | 3100   | 2                  | Own    | 4-4 1/2 x 6 1/2         | G, K, D         | 8-9           | Leader          | 18-35         | 2775      | 2                  | Clim.  | 4-5 x 6 1/2             | G, K            | 3-4             | Townsend        | 25-50      | 2750   | 2                  | Own    | 4-8 1/2 x 10            | Ker.            | 4-8             |                 |      |   |
| Best              | 60      | 5450   | 2                  | Own    | 4-6 1/2 x 8 1/2         | G, K, D         | 8-9           | Leonard         | 20-30         | 2530      | 4                  | Buda   | 4-4 1/2 x 6             | G, K            | 3-4             | Traction Motor  | 40-50      | .....  | 4                  | .....  | 8-3 1/2 x 5             | Gas.            | 4-5             |                 |      |   |
| Boring            | 1921    | 1850   | 3                  | Wauk.  | 4-4 1/2 x 6 1/2         | G or K          | 2             | Liberty         | 18-32         | 2175      | 4                  | Clim.  | 4-5 x 6 1/2             | G, K            | 4               | Traylor         | 6-12       | 715    | 4                  | LeR.   | 4-3 1/2 x 4 1/2         | Gas.            | 1-2             |                 |      |   |
| Barn-Oil          | 15-30   | 1650   | 4                  | Own    | 2-6 1/2 x 7             | Ker.            | 3-1           | Linn            | 40-70         | 4500      | 4                  | Cont.  | 4-4 1/2 x 5 1/2         | Gas             | 4               | Triumph         | 18-36      | 2150   | 2                  | Erd.   | 4-4 1/2 x 6             | Ker.            | 4               |                 |      |   |
| Capital           | 15-30   | 1000   | 2                  | Own    | 4-4 1/2 x 6             | Gas.            | 3             | Linn            | 60            | 5100      | 4                  | Wauk.  | 4-5 x 6 1/2             | Gas             | 4               | Trundaar        | 25-49      | 3750   | 2                  | Wauk.  | 4-5 x 6 1/2             | G or K          | 4               |                 |      |   |
| Case              | 10-18   | 800    | 4                  | Own    | 4-3 1/2 x 5             | G or K          | 2             | Little Giant    | 12-22         | 2200      | 4                  | Own    | 4-5 1/2 x 6             | K               | 6               | Turner          | 14-25      | 1295   | 4                  | Buda   | 4-4 1/2 x 5 1/2         | G, K            | 3               |                 |      |   |
| Case              | 15-27   | 1680   | 4                  | Own    | 4-4 1/2 x 6             | G or K          | 3             | Little Giant    | 18-25         | 3300      | 4                  | Own    | 4-5 1/2 x 6             | K               | 6               | Twin City       | 12-20      | 1580   | 4                  | Own    | 4-4 1/2 x 6             | G, K            | 3               |                 |      |   |
| Case              | 22-40   | 3100   | 4                  | Own    | 4-5 1/2 x 6 1/2         | G or K          | 4-5           | Lombard         | 1921          | 85-150    | .....              | 2      | 6-5 1/2 x 6 1/2         | Gas.            | 16              | Twin City       | 20-35      | 3175   | 4                  | Own    | 4-5 1/2 x 6 1/2         | G, K            | 5               |                 |      |   |
| Caterpillar T16   | 25      | 3975   | 2                  | Own    | 4-4 1/2 x 6             | Gas.            | 4             | Lombard         | 1921          | 50        | .....              | 2      | 4-4 1/2 x 6 1/2         | Gas.            | 6-10            | Twin City       | 40-60      | 5250   | 4                  | Own    | 4-7 1/2 x 8             | G, K            | 8               |                 |      |   |
| Caterpillar T11   | 40      | 6050   | 2                  | Own    | 4-6 1/2 x 7             | Gas.            | 6             | Magnet          | 14-28         | 1875      | 4                  | Wauk.  | 4-4 1/2 x 6 1/2         | K & G           | 3               | Uncle Sam C20   | 12-20      | 1385   | 4                  | Weid.  | 4-4 x 5 1/2             | G               | 2-3             |                 |      |   |
| Centaur           | 5-2 1/2 | 355    | 2                  | N Way  | 2-4 1/2 x 5 1/2         | G or K          | 1             | Master Jr       | 5-10          | 535       | 4                  | LeR.   | 4-3 1/2 x 4 1/2         | Gas.            | 1               | Uncle Sam B19   | 20-30      | 2300   | 4                  | Beav.  | 4-4 1/2 x 6             | G or K          | 3-4             |                 |      |   |
| Chase             | 12-25   | 1725   | 3                  | Buda   | 4-4 1/2 x 5 1/2         | G or K          | 2-3           | MerryGar1921    | 2             | 230       | 2                  | Evin   | 1-2 1/2 x 2 1/2         | Gas.            | 1               | Uncle Sam D21   | 20-30      | 1985   | 4                  | Beav.  | 4-4 1/2 x 6             | G or K          | 3-4             |                 |      |   |
| Chicago           | 40      | 2500   | 4                  | Own    | 4-4 1/2 x 6             | Gas.            | 4             | Minne.          | 12-25         | 1290      | 4                  | Own    | 4-4 1/2 x 7             | G or K          | 3               | Universal       | 1-4        | 475    | 2                  | Own    | 1-3 1/2 x 5             | G               | 1               |                 |      |   |
| Cletrac           | 9-16    | 815    | 2                  | Own    | 4-3 1/2 x 4 1/2         | G, K, D         | 2             | Minne. Gen.P    | 17-30         | 1850      | 4                  | Own    | 4-4 1/2 x 7             | G or K          | 3-4             | Utilitor        | 501        | 2 1/2  | 4                  | Own    | 1-3 1/2 x 4 1/2         | G               | 1               |                 |      |   |
| Cletrac           | W       | 12-20  | 1495               | 2      | Own                     | 4-4 x 5 1/2     | G, K, D       | 2-3             | Minne.        | 22-44     | 3330               | 4      | Own                     | 4-6 x 7         | G or K          | 5-6             | Victory    | 1921   | 0-13               | 350    | 4                       | Gray            | 4-3 1/2 x 5     | Gas.            | 2    |   |
| Dakota            | 4       | 15-27  | 1500               | 3      | Dom.                    | 4-4 1/2 x 6     | Gas.          | 3               | Med.Duty      | 35-70     | 4600               | 4      | Own                     | 4-7 x 9         | G or K          | 8-9             | Victory    | 1921   | 15-30              | 1750   | 4                       | Wauk.           | 4-4 1/2 x 5 1/2 | Gas.            | 3    |   |
| Dart              | B.J.    | 15-30  | 1800               | 4      | Buda                    | 4-4 1/2 x 6     | Gas.          | 3-4             | Minne.        | HeavyDuty | 8-16               | 785    | 2                       | Light           | 4-3 1/2 x 4 1/2 | K or G          | 1-2        | Wim    | B                  | 15-30  | 1650                    | 4               | Wauk.           | 4-4 1/2 x 5 1/2 | Gas. | 3 |
| Degue             | A       | 20-30  | 2380               | 4      | Buda                    | 4-4 1/2 x 5 1/2 | Gas.          | 3               | Mohawk        | 1921      | 8-18               | 990    | 2                       | Own             | 4-3 1/2 x 4 1/2 | K or G          | 2-3        | Walsh  | B                  | 15-30  | 1650                    | 4               | Wauk.           | 4-4 1/2 x 5 1/2 | Gas. | 3 |
| Dill              | R.W.    | 20     | 2980               | 4      | Cont.                   | 4-4 1/2 x 5 1/2 | Gas.          | 3               | Moline Univ D | 9-18      | 1075               | 2      | Own                     | 4-3 1/2 x 5     | Gas.            | 2-3             | Waterloo   | N      | 12-25              | 1500   | 4                       | Own             | 2-6 1/2 x 7     | G, K            | 2    |   |
| Do-It-All         | A       | 3-6    | 595                | .....  | Own                     | 1-4 1/2 x 5     | Gas.          | 1               | Moline Orch.  | 1 1/2     | 195                | 2      | Own                     | 1-2 1/2 x 3 1/2 | Gas.            | 2-3             | Webfoot    | 53     | 28-53              | 5000   | 2                       | Wisc.           | 4-5 1/2 x 7     | G, D            | 6    |   |
| Eagle             | F       | 12-22  | .....              | 4      | Own                     | 2-7 x 8         | G or K        | 3-4             | Motacul.      | 9-18      | 1075               | 2      | Own                     | 4-3 1/2 x 5     | Gas.            | 2-3             | Wellington | B      | 12-22              | .....  | 4                       | Erd.            | 4-4 x 6         | Ker.            | 2-3  |   |
| E-B               | AA      | 12-20  | 1445               | 4      | Own                     | 4-4 1/2 x 5     | G, K, D       | 3               | Motax         | 15-30     | 2250               | 4      | Buda                    | 4-4 1/2 x 6     | Gas.            | 3-4             | Wellington | F      | 16-30              | .....  | 4                       | Chief           | 4-4 1/2 x 6     | Ker.            | 3-4  |   |
| E-B               | Q       | 12-20  | 925                | 4      | Own                     | 4-4 1/2 x 5     | G, K, D       | 3               | NR            | 3-6       | 425                | 4      | Own                     | 2-3 1/2 x 4     | Gas.            | 1               | Western    | 1921   | 16-32              | 2100   | 4                       | Clim.           | 4-5 x 6 1/2     | Gas.            | 4    |   |
| E-B               | 16-32   | 2080   | 4                  | Own    | 4-5 1/2 x 7             | G, K, D         | 4             | Nichols-Shep.   | 20-42         | 3100      | 4                  | Own    | 8 x 10                  | G or K          | 3-6             | Wetmore21-22    | 12-25      | 1585   | 4                  | Wauk.  | 4-4 x 5 1/2             | G, K            | 3               |                 |      |   |
| Evans             | 18-30   | 2000   | 4                  | Buda   | 4-4 1/2 x 6             | G, K            | 3             | Nichols Shep.   | 25-50         | 3460      | 4                  | Own    | 9 x 12                  | G or K          | 4-7             | Wharton         | W-E        | 12-20  | 1800               | 3      | Buda                    | 4-4 1/2 x 5 1/2 | Gas.            | 2               |      |   |
| Fageol            | D       | 9-12   | 1525               | 4      | Lye.                    | 4-3 1/2 x 5     | Gas.          | 2               | Nichols Shep. | 25-50     | 3460               | 4      | Own                     | 9 x 12          | G or K          | 4-7             | Whitney    | W-E    | 6-18               | .....  | 4                       | Own             | 2-5 1/2 x 6 1/2 | Gas.            | 2    |   |
| Farm Horse        | B       | 18-30  | 1885               | 4      | Clim.                   | 4-5 x 6 1/2     | G, K          | 3-4             | Nilson Senior | 20-40     | 2475               | 5      | Wauk.                   | 4-5 x 6 1/2     | G, K            | 4               | Wichita    | T      | 15-30              | 2000   | 4                       | Beav.           | 4-4 1/2 x 6     | G, K, D         | 3-4  |   |
| Farquhar          | 15-25   | .....  | 4                  | Buda   | 4-4 1/2 x 6             | G, K, D         | 3-4           | Oil Pull        | K             | 12-20     | 1485               | 4      | Own                     | 2-6 x 8         | K, D            | 3               | Wisconsin  | E      | 16-30              | 2250   | 4                       | Clim.           | 4-5 x 6 1/2     | G or K          | 3    |   |
| Farquhar          | 18-35   | .....  | 4                  | Own    | 4-6 x 8                 | G, K, D         | 4-5           | Oil Pull        | H             | 16-30     | 2285               | 4      | Own                     | 2-7 x 8 1/2     | K, D            | 4               | Wisconsin  | F      | 22-40              | 2450   | 4                       | Wauk.           | 4-5 x 6 1/2     | G or K          | 4    |   |
| Farquhar          | 25-50   | .....  | 4                  | Own    | 4-7 x 8                 | G, K, D         | 6-7           | Oil Pull        | K             | 20-40     | 3175               |        |                         |                 |                 |                 |            |        |                    |        |                         |                 |                 |                 |      |   |

# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

|                    |   |                 |
|--------------------|---|-----------------|
| Little Rock, Ark.  | Little Rock Automobile Dealers' Assn.         | Nov. 11-19      |
| New York           | Closed Body Exhibition                        | Nov. 14-19      |
| Jersey City        | Second Annual Show                            | Nov. 14-19      |
| Chicago            | Automotive Equipment Show                     | Nov. 14-19      |
| Cincinnati         | Automotive Equipment Exposition               | Nov. 26-Dec. 3  |
| New York           | Automobile Salon                              | Nov. 27-Dec. 3  |
| London, Ontario    | National Motor Show of Western Canada         | January         |
| New York           | National Automobile Show                      | Jan. 7-13       |
| Buffalo            | Buffalo Automobile Dealers' Assn.             | Jan. 14-21      |
| Tulsa, Okla.       | Automobile Show                               | Jan. 16-21      |
| Oakland, Calif.    | Automobile Show                               | Jan. 16-22      |
| Milwaukee          | Fourteenth Annual Automobile Show             | Jan. 19-25      |
| Cleveland          | Cleveland Automobile Mfrs. and Dealers' Assn. | Jan. 21-28      |
| Portland, Ore.     | Annual Automobile Show                        | Jan. 23-29      |
| Chicago            | National Automobile Show                      | Jan. 28-Feb. 3  |
| Chicago            | Automobile Salon                              | Jan. 28-Feb. 3  |
| Minneapolis        | Tractor Show                                  | Feb. 6-11       |
| Minneapolis        | Automobile Show                               | Feb. 6-11       |
| Winnipeg, Canada   | Canadian Automotive Equipment Assn. Show      | Feb. 6-11       |
| Kansas City        | Kansas City Motor Dealers' Assn.              | Feb. 9-16       |
| Atlanta            | Southern Automobile Show                      | Feb. 11-18      |
| San Francisco      | Sixth Annual Pacific Automobile Show          | Feb. 11-18      |
| Louisville, Ky.    | Fourteenth Annual Automobile Show             | Feb. 20-25      |
| Syracuse           | Fourteenth Annual Automobile Show             | Feb. 20-25      |
| Des Moines         | Winter Automobile Show                        | Feb. 26-March 3 |
| Springfield, Mass. | Seventh Annual Automobile Show                | Feb. 27-March 4 |
| Brooklyn           | Eleventh Annual Show                          | March 4-11      |
| Boston             | Annual Automobile Show                        | March 11-18     |
| Newark, N. J.      | Newark Automobile Dealers' Assn.              | March 11-18     |

## RACES

|             |               |         |
|-------------|---------------|---------|
| Los Angeles | Speedway Race | Nov. 24 |
|-------------|---------------|---------|

## FOREIGN SHOWS

|                        |                        |                 |
|------------------------|------------------------|-----------------|
| Paris                  | Aviation Exhibition    | Nov. 12-27      |
| Shanghai, China        | Automobile Show        | Nov. 26-Dec. 3  |
| Santiago, Cuba         | Annual Automobile Show | March, 1922     |
| Rio de Janeiro, Brazil | Automotive Exhibition  | September, 1922 |

## CONVENTIONS

|              |   |            |
|--------------|---|------------|
| Cleveland    | National Tire Dealers' Association                                    | November   |
| Chicago      | Annual Meeting and Business Exhibits of<br>Automobile Equipment Assn. | Nov. 14-19 |
| Indianapolis | Indiana Automotive Trade Assn. Convention                             | Nov. 16-17 |
| Columbus, O. | Ohio Automotive Trade Assn. Meeting                                   | Dec. 12-14 |
| Chicago      | American Road Builders' Convention and Show                           | Jan. 17-20 |
| Chicago      | Fifth Annual N. A. D. A. Convention                                   | Jan. 30-31 |

## NATIONAL GOOD ROADS SHOW

Chicago, Nov. 14—In connection with the meeting of the American Good Roads Congress and the annual convention of the American Road Builders' Assn., at the Coliseum, Jan. 17-20, will be held the National Good Roads Show. This exhibition will embrace road building machinery of all kinds. More space for the show than is available has been subscribed and many exhibitors will be forced to find outside housing for their displays.

## FREY ENTERS NEW FIELD

Chicago, Nov. 12—The Charles Daniel Frey Co., which for a number of years has conducted an idea and advertising illustration service, will discontinue this line of work Nov. 30 and enter the advertising agency field.

## CHARGED TOOLS STING COP

Seattle, Nov. 11—W. C. Fisk of this city determined to punish thieves who have been stripping his tool bags. So he charged one with electricity and left it standing in front of his home. Motorcycle Patrolman G. C. Jensen, investigating after a frightened passerby had complained, received a shock that roused his ire. He arrested Fisk, charging him with disorderly conduct. The case is pending.

## PRICES OF HALEE CRANKPIN TOOL

Owing to a typographical error in the October issue of MOTOR AGE, the prices of the Halee crankpin tool were given as \$35 for the one to two-inch size and \$40 for the two to three-inch size. The correct prices are \$40 and \$45, respectively, as advertised by the H. A. Lee Tool & Mfg. Co., Kansas City, Mo.

## Four Points Govern Lamps Under Buckeye Lens Law

Regulations Apply to Passenger Cars and Light Trucks—Heavy Trucks Separate

COLUMBUS, O., Nov. 12—Experts from the engineering department of the Ohio State university have devised several important points with reference to the new headlight governing law in Ohio, which are of much interest to motorists generally. The provisions of the law not only apply to passenger cars, but also to light trucks and delivery wagons, but not to heavy trucks. The heavy trucks are regulated under a separate law.

The four important points to be followed in complying with the law are:

**First**—The lamp must not direct the beam of light upward. This is a common source of trouble. Some devices require a horizontal beam, while others direct the light downward.

**Second**—The lamp must have the proper relation to the focus of the reflector; that is, it must be neither too far forward nor too far back, but at just the right place. Instructions with both of the above points should accompany every device sold.

**Third**—The lamp used should be of the Mazda-C or gas filled type, preferably of 21 cp. and never more than 32. The approval of a device by the Ohio Highway Department does not guarantee that satisfactory results can be obtained from it with any other than 21 cp.

**Fourth**—The reflector and the glass must be clean and not out of shape, and the electric system must be in good condition.

## MOTORIZES BRANCH LINE

St. Paul, Nov. 11—The Northern Pacific Railroad has bought a motor train from the Mack Truck Co. for passenger service on the Gilmore & Pittsburgh line, a subsidiary of the main line in the mountain district between Armstead in Montana and Salmon City in Idaho. Economy and better and more frequent service is expected from the venture. The car will carry 18 passengers and baggage.

## UNEMPLOYMENT INCREASE

Washington, Nov. 11—Slowing up of production in the automotive plants and in factories producing vehicles for land transportation resulted in a decrease in employment of 2.8 per cent in October, as compared with September, according to the industrial survey conducted by the United States Employment Service. The actual decrease from reporting establishments amounted to 4,883.

## FARGO TRACTOR REDUCES

Chicago, Nov. 11—The Fargo Motor Car Co. has announced a \$600 price reduction on its 2-ton tractor; old price, \$2500; new price, \$1900.